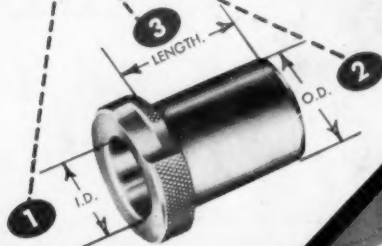


MODERN Machine Shop

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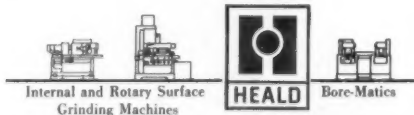
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MODERN Machine Shop

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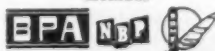
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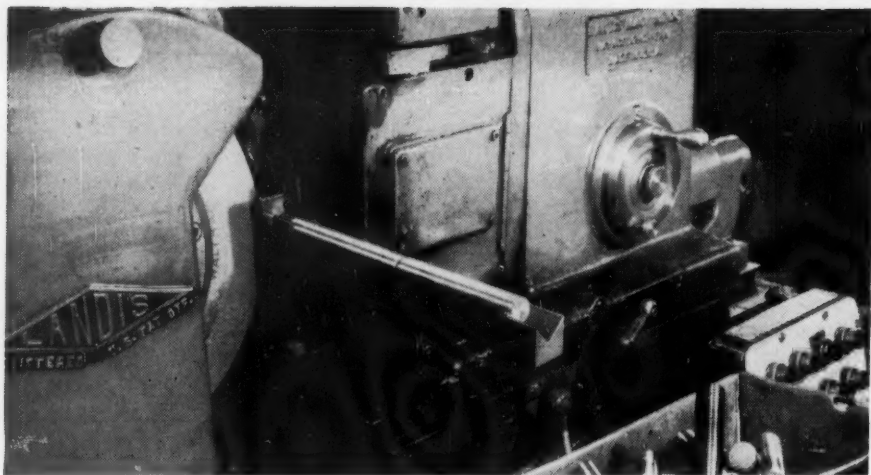
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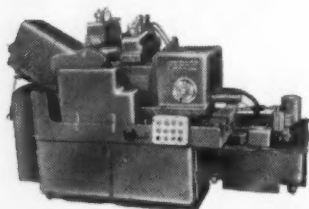
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Studs for high-pressure high-temperature service ranging from $\frac{5}{8}$ " to 1 $\frac{1}{2}$ " in diameter are threaded from blanks of SAE 4140 steel heat-treated to a 260-320 Brinell hardness. In the operations illustrated, 1 $\frac{1}{8}$ " 8 pitch UN threads must be generated 10" long to a Class 7 fit to meet ASA standards (Manual B 1.4). These threads are produced with LANDIS #1 Centerless Thread Grinders by continuous thru-feed grinding at the rate of 7 $\frac{1}{4}$ linear inches per minute, *or better*. The excellent quality and smooth finish of the ground thread has reduced final assembly time and minimized galling.

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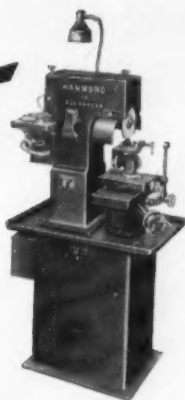
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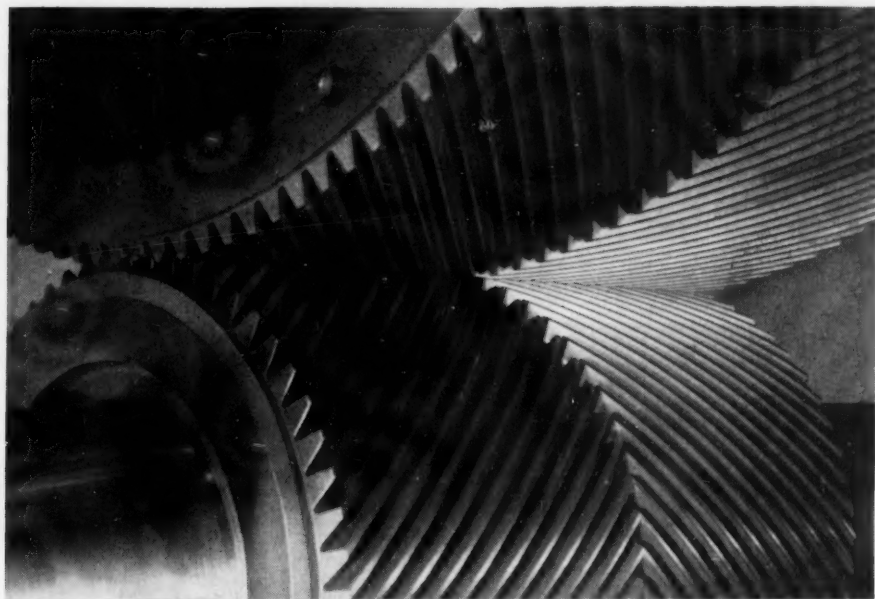
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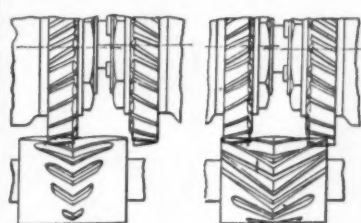
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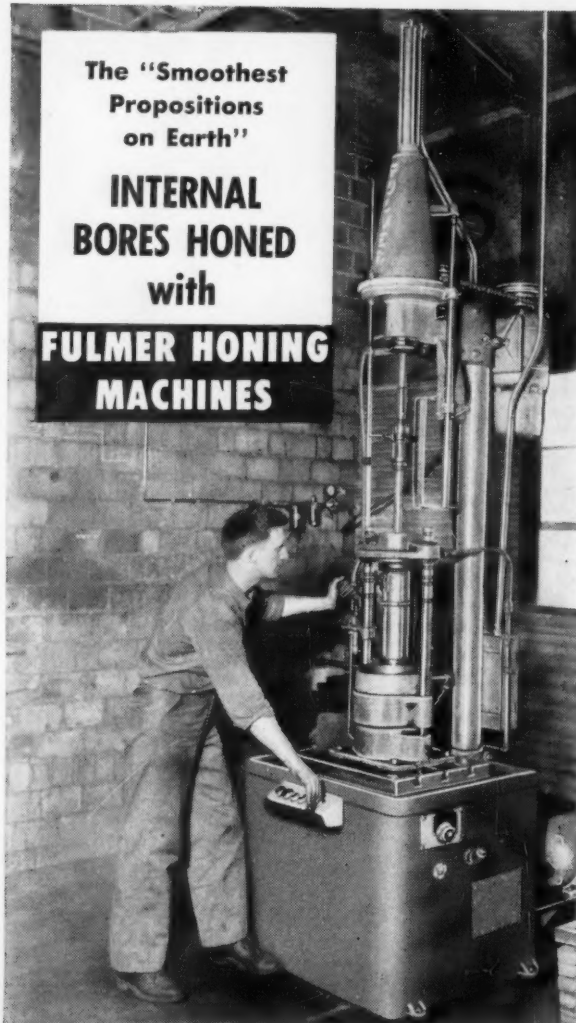


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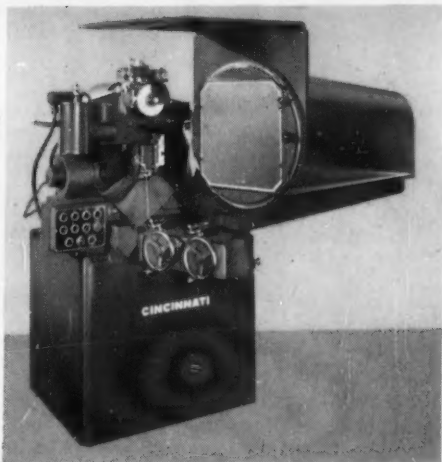
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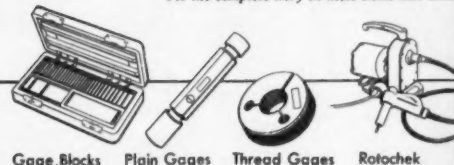


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machine tool builder Greaves



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tells why he uses LeBlond lathes

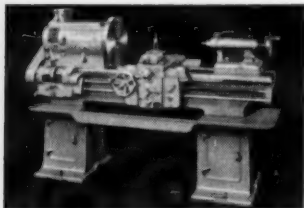
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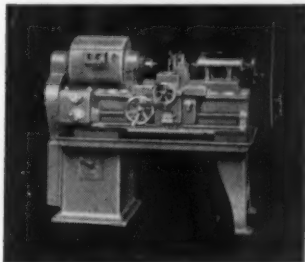


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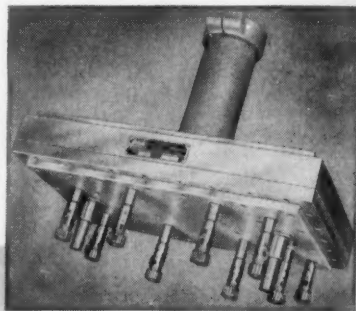
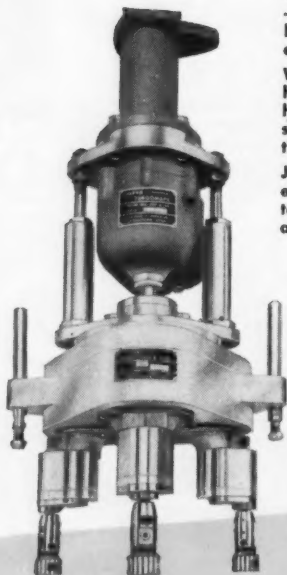
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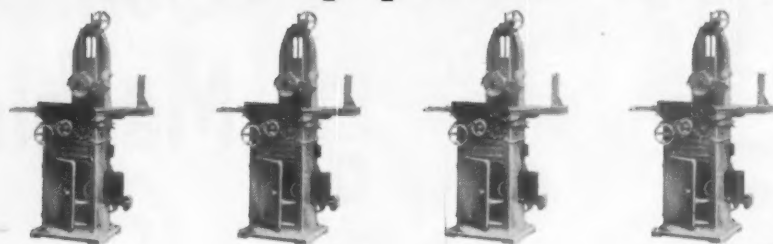
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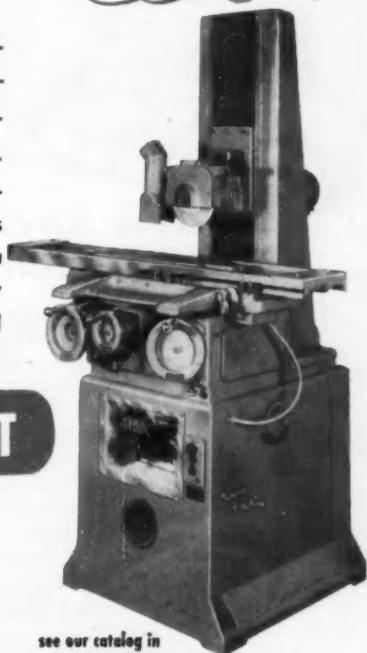
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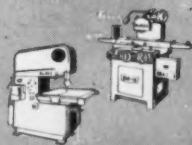
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And, never before have machines in this size and price class been available with such a great variety of attachments. There is no class of work within

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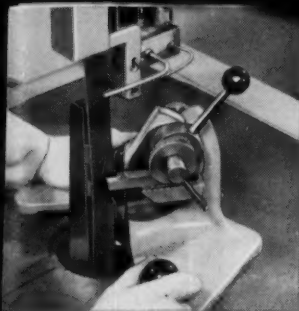
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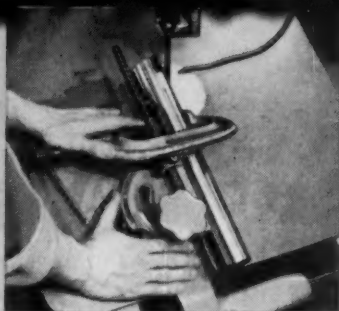


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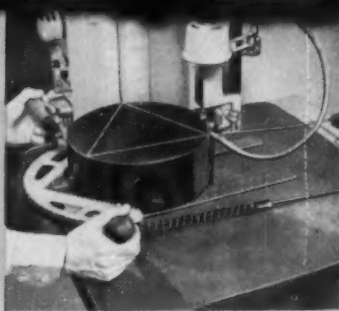
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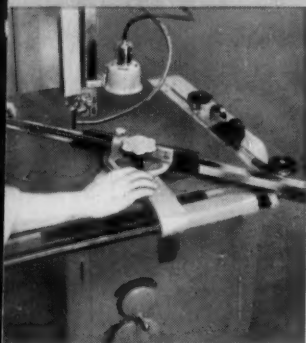
NEW carbide tool finishing attachment with abrasive bands!



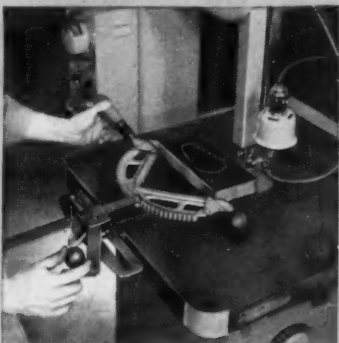
TILTING table plus mitering attachment produces compound angles.



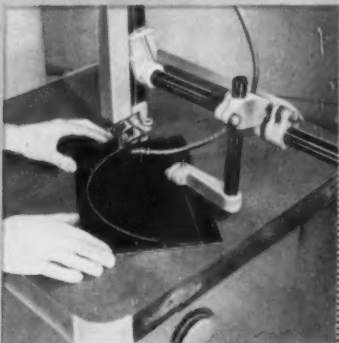
HEAVY work slide attachment with power feed reduces fatigue, speeds work.



CUT-OFF and mitering attachment provides precision accuracy, speed.



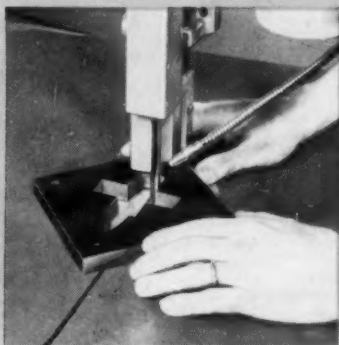
RATCHET feed and work-holding jaw for ease and speed.



DISC cutting attachment produces perfect circles fast and easily.



RIP fence makes fast, precision cutting a simple job.



FILING—internal or external with DoALL file bands.



ELECTRIC etching pencil for layout work.



See this
New DoALL in Operation
Ask For Free Demonstration
at your Plant—
No Obligation

EXCEL No. 6 PAYS BOTH WAYS

**TOOL & CUTTER
GRINDING
HEADQUARTERS
in the smaller shop—**

**EXTRA SHARPENING
SERVICE
in the larger plant—**



*Builders
of Precision
Grinders
for 79
Years*

An outstanding value in price and performance! The Excel No. 6 Universal Cutter and Tool Grinder will accurately sharpen reamers and milling cutters in a wide variety of shapes and sizes. A full line of attachments is available for a multitude of applications including cylindrical and internal grinding. Base optional.

Swings work.....8" dia. x 16" long
Face mill capacity.....12" dia.
Table surface.....4" x 24"

**PROMPT DELIVERY
FOR DEFENSE**

COVEL
**PRECISION
GRINDERS**

BENTON HARBOR — MICHIGAN

DRILL
GRINDERS
CUTTER &
TOOL GRINDERS
HYDRAULIC & HAND
FEED SURFACE GRINDERS

*Write
for
BULLETIN
E-64*

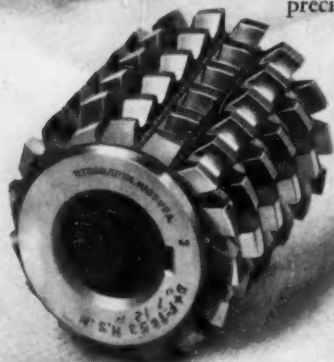
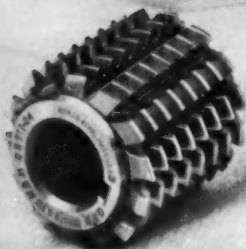
U N

N



Precision was built into every detail of this Nineteenth Century clock.

Today, the finest gears are mechanically reproduced by means of precision-built hobs. For the best in hobs — demand precision hobs by Union.



Renaissance 19th Century French Clock,
made in Paris by RAINGO, Circa 1840

- HOBBS**
- Involute Spline
 - Parallel Spline
 - Worm Gear
 - Tangential
 - Spur Gear
 - Helical Gear
 - Ground
 - Unground
 - Accurate Unground
 - Finishing
 - Roughing
 - Pre shave
 - Protuberance
 - Stub-Tooth
 - Standard Gear
 - Composite Form
 - Combination Pitch
 - Topping
 - Semi-Topping
 - Non-Topping
 - Herringbone Gear
 - Shank Type
 - Shell Type
 - Serration
 - Square Shaft
 - Tapered Hole
 - Multiple Thread
 - Special Shape

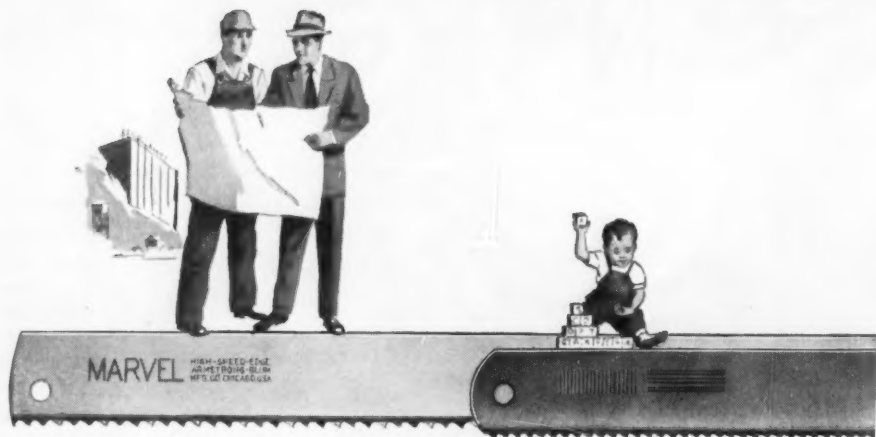
- SPROCKET**
- Silent Chain
 - Roller Chain
 - Special

UNION TWIST DRILL COMPANY • ATHOL, MASSACHUSETTS

Milling Cutters Gear Cutters Twist Drills Hobs Reamers Carbide Tools

OWNERS AND OPERATORS OF: S. W. CARD MANUFACTURING CO. DIVISION, Mansfield, Mass.
BUTTERFIELD DIVISION, Derby Line, Vermont and Rock Island, Quebec

CUT INVENTORY COSTS, ORDER FROM YOUR LOCAL DISTRIBUTOR



...but

Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

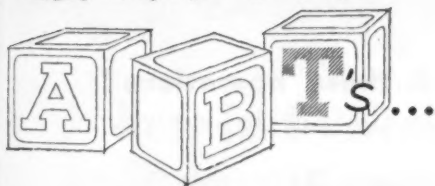
There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate—without the "know-how" of MARVEL EXPERIENCE . . .

Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be **SAFE**, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!



ARMSTRONG-BLUM MFG. CO. • 5700 Bloomingdale Ave. • Chicago 39, U. S. A.

LEARNING HIS



You can't expect a seven-year old, just beginning to cross his T's, to understand the intricacies of a T Lathe. But kids say bright things. This youngster, on a recent plant tour, summed up the outstanding characteristic of the 60" T Lathe, exclaiming: "Gee, that powerful machine sure is gentle."

Yes, the T Lathe is "gentle"—sensitive to the most delicate cut. T Lathes are designed for thin-wall, short length and large diameter work. These lathes have solved the problem of straight and contour facing, turning and boring parts formerly machined on over-size, conventional lathes and boring mills.

There is a T Lathe to cut time and costs on your large diameter, short length parts machining. Write for Bulletin 215, The Lodge & Shipley Co., 3055 Colerain Avenue, Cincinnati 25, Ohio.



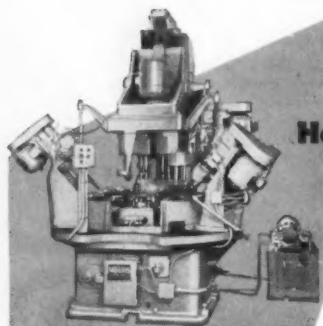
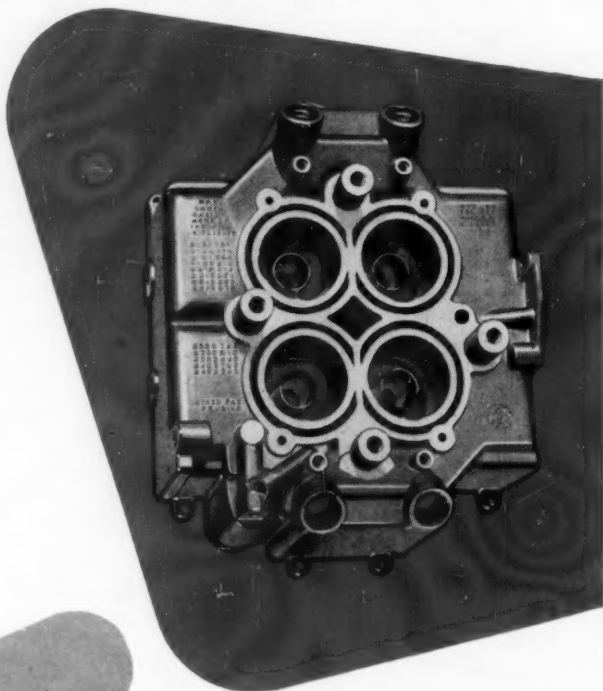
Lodge & Shipley

...the logical choice!

How would you do all these operations?

... fast, with utmost precision, at lowest cost

DRILL	2	HOLES
TAP	2	HOLES
DRILL	2	HOLES
REAM	2	HOLES
TAP	2	HOLES
FACE	4	SURFACES
CLEANOUT	4	DIAMETERS
FACE	4	SURFACES
TAP	2	HOLES
REAM	2	HOLES
DRILL	2	HOLES
TAP	2	HOLES
DRILL	2	HOLES



Here's the Morris Mor-Speed answer

... combining 32 operations,
delivering up to 375 parts per hour!

Imagine the machines, and floor space required to do this part on a separate machine basis! Instead, there's just one machine, producing approximately six parts per minute!

Important too, there's no sky-high "special machine" price tag on this or any Morris MOR-SPEED. Standard machining units are grouped on a standard base, around a standard indexing table and provided with the necessary tooling. The result is high production at lowest cost.

Although your multiple drilling, tapping, reaming and similar operations may not be as complicated as this Morris installation, chances are Morris Engineers can show you proof of substantial savings. Investigate today.

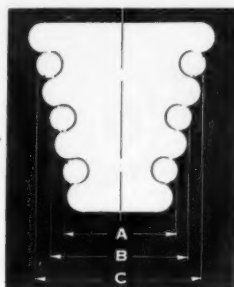


Morris

THE MORRIS MACHINE TOOL COMPANY,
934 HARRIET ST., CINCINNATI 9, OHIO

New Taft-Peirce CompAIRator Air Gage *Measures and Computes*

**4 DIMENSIONS
SIMULTANEOUSLY**



The CompAIRator above checks serrations in the root section of jet engine turbine blades. Does automatically and instantly what formerly took skilled hands many minutes to do.

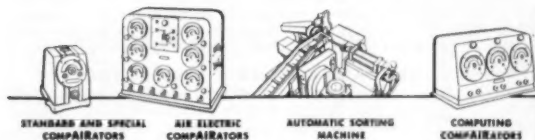
Three of the air indicators measure thickness "over rolls" of the serrated sections. At the same time, a T-P Computing CompAIRator computes the difference between two of these dimensions and compares it to a standard



value. If the variation is greater than plus or minus .001" on the dial, the part is rejected. Most important of all, the serrations can be checked over their entire length.

Two different models of this gage have been built. One permits gaging with the part in the grinding fixture — thus eliminating many costly rejects. The other serves as a final inspection gage.

This unit is typical of the hundreds of Taft-Peirce CompAIRators now simplifying complicated gaging operations. For more information on this and many other items, send for your copy of the Taft-Peirce Handbook.

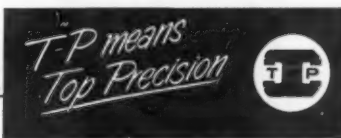


STANDARD AND SPECIAL
COMPAIRATORS

AIR ELECTRIC
COMPAIRATORS

AUTOMATIC SORTING
MACHINE

COMPUTING
COMPAIRATORS



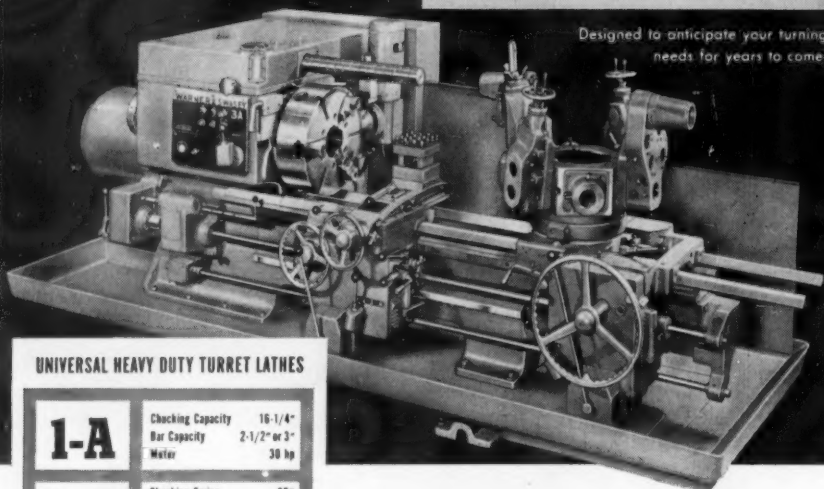
THE TAFT-PEIRCE MANUFACTURING COMPANY, WOONSOCKET, R. I.

COMPLETELY NEW!

A whole new line of saddle type turret lathes...

by **WARNER & SWASEY**

Designed to anticipate your turning needs for years to come.



UNIVERSAL HEAVY DUTY TURRET LATHES

1-A

Chuck Capacity 16-1/4"
Bar Capacity 2-1/2" or 3"
Motor 30 hp

2-A

Chuck Swing 20"
Bar Capacity 3-1/2" or 4-1/2"
Motor 40 hp

3-A

Chuck Swing 23-1/2"
Bar Capacity 4-1/2" or 6"
Motor 60 hp

4-A

Chuck Swing 28-1/4"
Bar Capacity 6" or 12"
Motor 75 hp

**WARNER
&
SWASEY**
Cleveland
PRECISION
MACHINERY
SINCE 1880

MORE POWER—increased up to 75 hp. in new 4-A! Gives you more than enough power for any job—faster removal of metal at all speeds!

MORE SPEEDS—16 speeds with smaller increments provide ideal speeds for *more* work diameters, increased production and tool life! 32 *unduplicated* speeds with 2-speed motor!

AUTOMATIC SPEED CHANGES—automatic hydraulic gear shifting in a matter of seconds on 2-A, 3-A and 4-A—boosts production, cuts operator fatigue! New 1-A's constant-mesh gear train with hydraulic clutches *eliminates* gear shifting completely!

SIMPLIFIED ZONE CONTROLS—eliminate waste, motion and facilitate machine handling—increase operator efficiency! Single master control lever controls gear shifting, spindle stops, starts, and reverses!

IMPROVED ATTACHMENTS—Hydraulic chuck and bar feed with power return—for easier handling, less operator fatigue! New power chuck wrench eliminates backbreaking effort when chucking. Does not obstruct spindle bore!

RETAINS STANDARD WARNER & SWASEY TOOLING—all existing saddle type tools of the world's largest and most complete line can be used on these new turret lathes.

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY

Box Column Drill--30 Inch Swing!

Another JOHANSSON LOW COST, High Quality Machine Tool

A powerful, large capacity drilling machine, priced within the budget of every machine shop.

With 30" swing, big table, rugged construction, and completely geared head with constant torque motor giving practically unlimited power to the spindle, here is a machine that will handle any job that comes along with speed, ease and accuracy.

Eight speeds to the spindle can be instantly selected without even stopping the motor. Automatic drill ejector permits quick tool changes. Controls and locks are placed at the operator's fingertips. Well-proportioned, massive construction provides rigidity and sensitivity for use of the smallest drills up to the largest. There has long been a need in industry for such a machine.

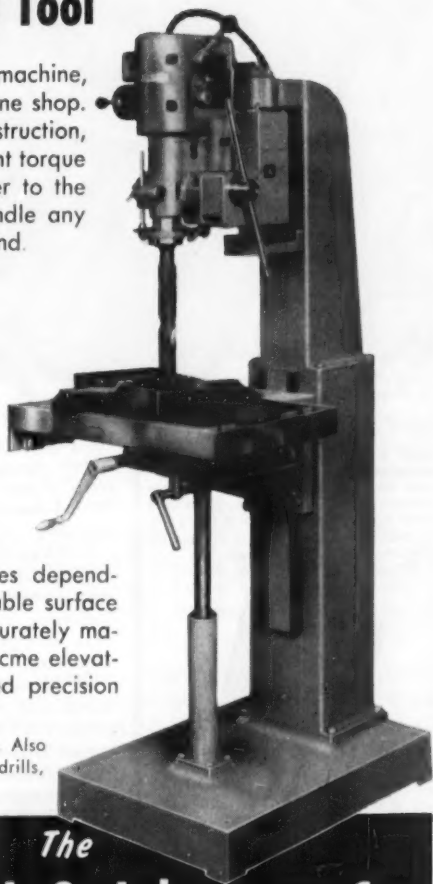
Precision construction throughout gives dependable accuracy. Spindle is square with table surface within .001" in a 12 inch circle. The accurately machined table is supported on a heavy, Acme elevating screw and guided on hardened and precision ground ways.

Machine can be had with power feed to quill. Also multiple spindle and special machines, column drills, available.

CONDENSED SPECIFICATIONS

Swing	30"
Max. Dist. Spindle to Table	28"
Min. Dist. Spindle to Table	3½"
Table Size	15" x 24"
Spindle Speeds (8)	125 - 1540
Spindle Taper	No. 3 Morse

Write for FREE Bulletin



The
I. O. Johansson Co.
7730 Austin Avenue
Skokie - Illinois



VK Set No. 20 HS Thread Measuring Wires, accurate to $\pm .000025''$ for 20 common pitch Unified and American screw threads, 6 to 36 threads per inch.

The Van Keuren Catalog and Handbook No. 35 contains 91 pages of technical and engineering information on wire measurement of screw threads. This information, compiled from many years research in the field, is available without charge by addressing: The Van Keuren Co., 175 Waltham St., Watertown, Mass.



The three-wire method is probably the best known and most widely accepted system of measuring pitch diameter of screw threads. Equipment required includes only a set of VK Thread Measuring Wires of proper diameter and an accurate measuring instrument.

Van Keuren Thread Measuring Wires have been developed over a period of many years of pioneering in the precise measurement field. They are made to National Bureau of Standards specifications, are held within $.00002''$ for roundness, straightness and identity and to within $.000025''$ of exact size.

VK Thread Measuring Wires are made of long-wearing, tough and beautifully finished high speed steel and are either $1\frac{1}{2}''$ or $2''$ in length. Every wire is subjected to the closest criteria in today's standards of accuracy.

In addition to set No. 20, shown here, VK furnishes many other standard sets as well as special wires in diameters from $.001''$ to $1.500''$.



THE *Van Keuren* co.,

175 WALTHAM STREET, WATERTOWN, MASS.

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carbide Plug Gages • Carbide Cemented Carbide Measuring Wires • Chromo Carbide Taper Insert Plug Gages



50,000 HOLES per grind



Many manufacturers are discovering that Whitman & Barnes carbide reamers reduce machine down-time and costs by providing more holes per grind. Typical is the above illustrated reaming of $\frac{1}{2}$ " diameter holes in the cast iron planet carrier assembly at a well known automobile plant.

Six flute W & B carbide reamers were selected by this Michigan manufacturer to secure on this tough operation a maximum number of reamed holes per grind. These W & B carbide reamers are consistently reaming 50,000 or more holes before regrinding is required. This high performance is characteristic of the quality designed and manufactured into every W & B carbide reamer.

In addition to complete lines of carbide drills and reamers, Whitman & Barnes manufactures many other carbide cutting tools, also drills and reamers of high speed steel. For finest quality, long-life and a reduction in your cutting costs—select W & B tools.



YOUR INDUSTRIAL DISTRIBUTOR

Can Give You Quick Service
On Whitman & Barnes Tools.
Contact Him Today!



WHITMAN & BARNES

40050 PLYMOUTH ROAD • PLYMOUTH, MICH.

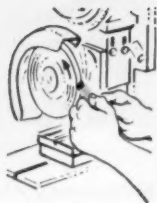
NEW YORK • CHICAGO • LOS ANGELES • ATLANTA

Have You Tried a NORBIDE® Dressing Stick?



Just a couple of passes
with a NORBIDE Dressing
Stick . . . that's all it takes to . . .

Clean up a wheel face



A NORBIDE Dressing Stick of
Boron Carbide — the hardest
man-made material — will out-
last hundreds of ordinary dress-
ing sticks.

With this light, handy stick
you can see more of the wheel
and thus avoid costly over-
dressing. You'll find it will
greatly reduce dressing dust
nuisance also.

Order a supply of these cost-
cutting sticks from your local
Norton distributor, or write for
Form 1567 giving more details.

Form a radius or groove



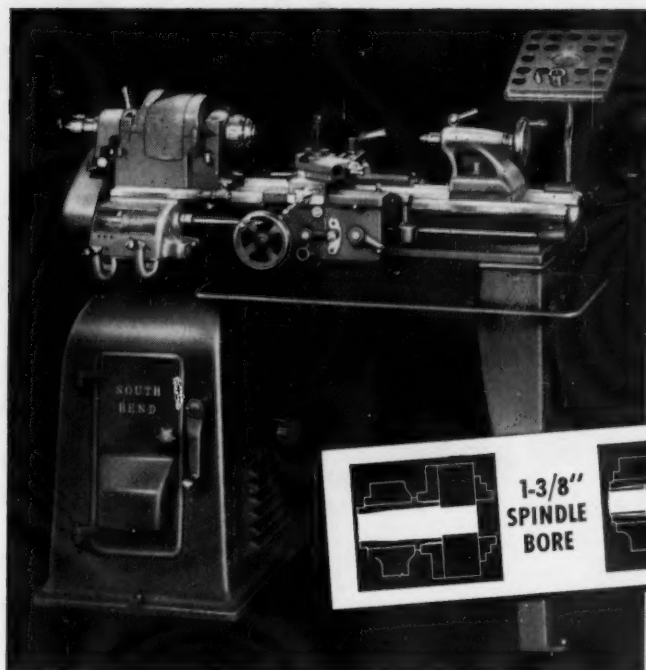
Touch up a cup or saucer



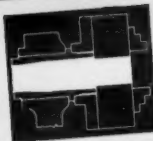
NORTON COMPANY, 49 New Bond Street, Worcester 6, Mass.



*Next to the diamond in hardness —
available at a fraction of diamond cost*



SOUTH BEND 10" Lathes



**1-3/8"
SPINDLE
BORE**



**1" COLLET
CAPACITY**

10" Precision TOOLROOM LATHE

Sound design, expert workmanship and quality materials give the 10" South Bend Lathe the dependable performance you want. Equipped with a precision lead screw, thread dial indicator and thread cutting stop, you can use it with confidence for cutting screw threads, making precision gauges or turning out instrument parts.

Another outstanding feature is the 1" collet capacity and 1-3/8" spindle bore which is built on the same design and specifications of larger lathes. The large spindle bore gives you big lathe collet capacity in a small, compact unit.

10" Toolroom Lathe, illustrated, less motor and controls. Time terms: 10% down, bal. 12 or 18 months.

\$1526.00

F.O.B. Factory

SPECIFICATIONS

SWING 10 1/4" over bed and saddle wings, 5 3/4" over cross slide.

COLLET CAPACITY.....1 in.

SPINDLE BORE.....1 3/8 in.

BED LENGTHS 3, 3 1/2, 4 feet.

CENTER DISTANCES....14 1/2 to 26 3/4 inches.

SPINDLE SPEEDS (12) 50 to 1357 r.p.m., approximately.

POWER LONGITUDINAL FEEDS 70 R.H. or L.H...0.0007" to .0836"

POWER CROSS-FEEDS70 .0003" to .0303"

THREAD CUTTING 70 R.H. or L.H. pitches, 4 to 480 per inch.

Compared with our costs
PRICES ARE LOWER
than they were back in 1941



Prices are closely tied to costs. Costs are still rising. Buy machine tools now before increased costs necessitate higher prices.

SEND INFORMATION CHECKED:

- ☐ 9" and 10" BENCH LATHES ☐ 10" to 16-34" FLOOR LATHES ☐ DRILL PRESSES ☐ TOOL GRINDERS ☐ 1/2" & 1" Collet TURRET LATHES ☐ 9" BENCH SHAPERS

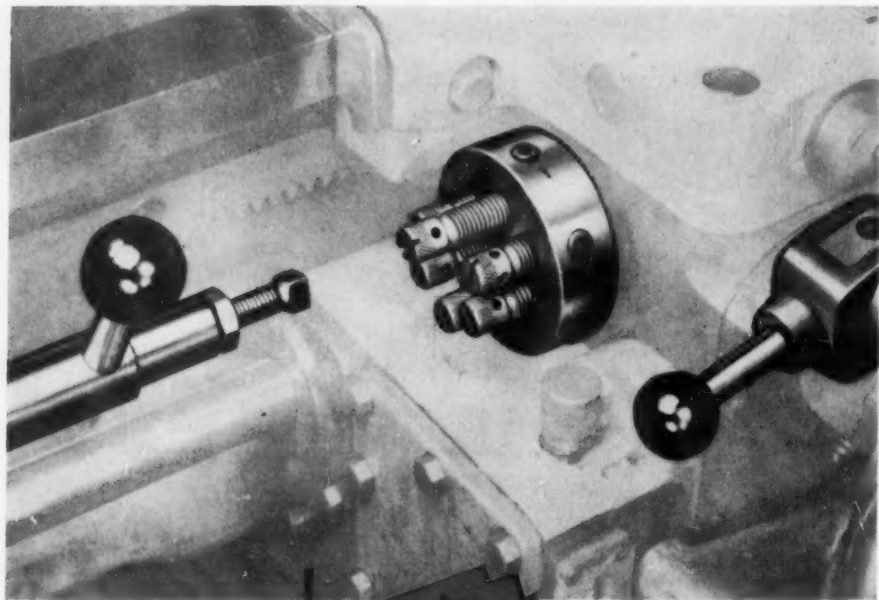
Name _____ Street _____

City _____ State _____

Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana



Operators do better on a J&L turret lathe



J&L TURRET LATHES GIVE

MORE Ease of Operation
MORE Power Transmission
MORE Rigidity
MORE Accurate Stops
MORE Efficient Lubrication
MORE Coolant on Cutting Tools
MORE Accurate Results

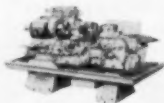
Here's why...

On Jones & Lamson turret lathes, carriage and saddle feeds are disengaged against positive stops, and are set easily and rapidly. They operate with extreme accuracy at either low or high feeds and speeds. When the stops are engaged, the feed lever is *automatically* disengaged through positive contact.

J & L Lathes have many other important built-in features, too, which enable operators to turn out *better* work *faster*, with minimum fatigue.



J & L Lathes — designed with the operator in mind — enable you to perform your job better, with less effort.



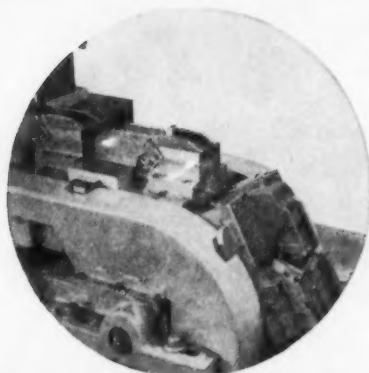
JONES & LAMSON

JONES & LAMSON MACHINE CO., 521 Clinton St., Dept. 710, Springfield, Vt., U.S.A.



Machine Tool Craftsmen
Since 1835

MACHINE TOOL DIV.



• Holding fixtures are designed for quick, convenient loading, with automatic clamping and unclamping.

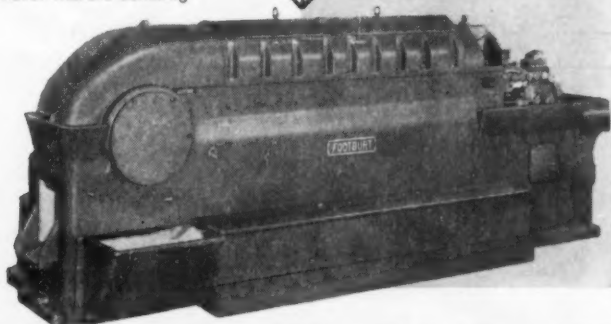
LOWER COST per piece with continuous SURFACE BROACHING on small parts...

• In many plants where large quantities of duplicate metal parts are being machined, substantial savings are being made through the adoption of surface broaching. Production is exceptionally high, close tolerances are maintained, and tool maintenance costs are much lower than with ordinary methods. Foote-Burt engineers, pioneers in this advanced machining method, have had a wide experience in applying surface broaching in many fields.

THE FOOTE-BURT COMPANY

Cleveland 8, Ohio

Detroit Office: General Motors Building



★
engineered
for
production

FOOTBURT

M A C H I N E T O O L S



... a record of
acceptance from
1938
to
1954

On August 8, 1938, 16 years ago, the first BRIDGEPORT TURRET MILLING MACHINE left our old plant for the Precision Die Casting Co., at Syracuse, N. Y.

Judging from the number of milling machines produced up to that time, the Toolmaker and the Patternmaker shown here with the 20,000th machine were most optimistic when they had hopes they might be able to sell 5,000 of these machines before the market was saturated.

Either the judgment of these two men was very bad or the machine they had developed was awfully good, because the 20,000th machine left our new, modern plant on March 18th, consigned to the Pioneer Electric & Research Corporation, Forest Park, Illinois . . . and every 45 minutes of a 50-hour

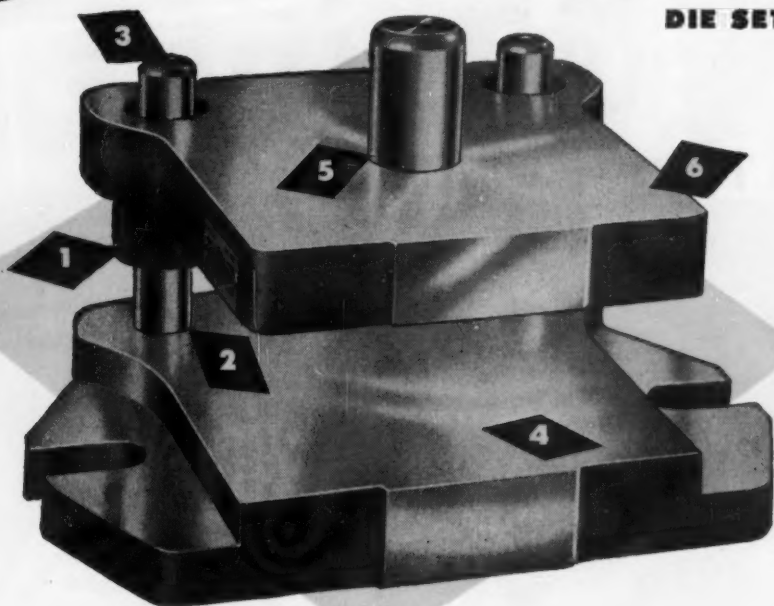
week, another "Bridgeport" goes forward to an impatiently waiting customer. Rest assured we shall always do our best to merit your continued confidence in the "Bridgeport" as expressed in its outstanding record of acceptance.

***Bridgeport* MACHINES, INC.**

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

6

reasons for buying.. **PRODUCTO****DIE SETS**

1. Bushings have an absolutely uniform inside diameter, resulting in full-bearing and extra long life.

2. New design die set gives added strength and assures accurate location of pin and bushing holes.

3. Accuracy of guide pins and bushings are checked on light gauges reading to 50 millionths of an inch.

4. Parallelism and flatness held to close limits by rough machining prior to grinding.

5. Shank, cast as integral part of semi-steel die set, can be inserted or welded on all-steel sets.

6. Surface plates, accurate to within .0001", check flatness of ground surfaces and parallelism of die set.

To make an accurate die, an accurate die set must be used. For this reason, every Producto die set is an instrument of precision.

If planning a new die today, order your die set by the new Producto catalog — selection is easy, delivery is prompt.

THE PRODUCTO MACHINE COMPANY
910 Housatonic Ave., Bridgeport 1, Connecticut

For Precision Die Sets Fast Call...



ALSO MAKERS OF DIE ACCESSORIES, FEEDING EQUIPMENT, VISES, MACHINERY.

SPD52B

June, 1954

MODERN MACHINE SHOP 33

TRIPLE savings IN YOUR GRINDING ROOM

1

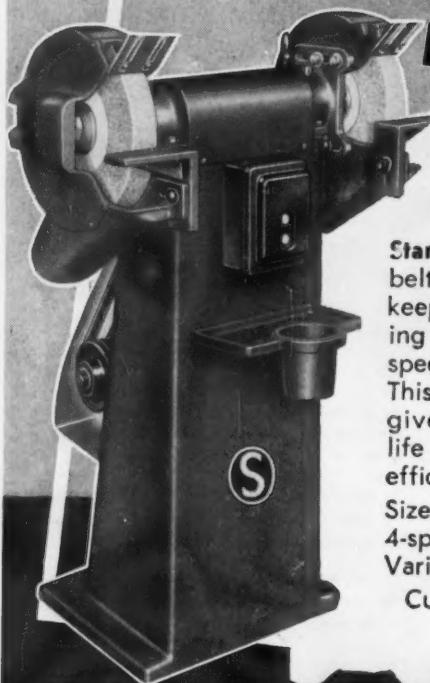
LOWER WHEEL COSTS

2

SAVES TIME

3

INCREASED PRODUCTION



ON GRINDERS
FROM 1 TO 100 H.P.

HERE'S HOW!

Standard's BDG self-contained belted motor driven grinders keep your grinding wheels turning at the correct peripheral speeds down to wheel flanges! This new engineering feature gives you maximum wheel life and far greater grinding efficiency.

Sizes: 10" 3-speed 1 H.P. to 30" 4-speed 60 H.P. Also Infinitely Variable Speed.

Cut your grinding costs today.

Write for Catalog 44.

TYPE BDG

THE **STANDARD** ELECTRICAL TOOL CO.

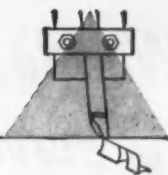
2487 RIVER ROAD

CINCINNATI 4

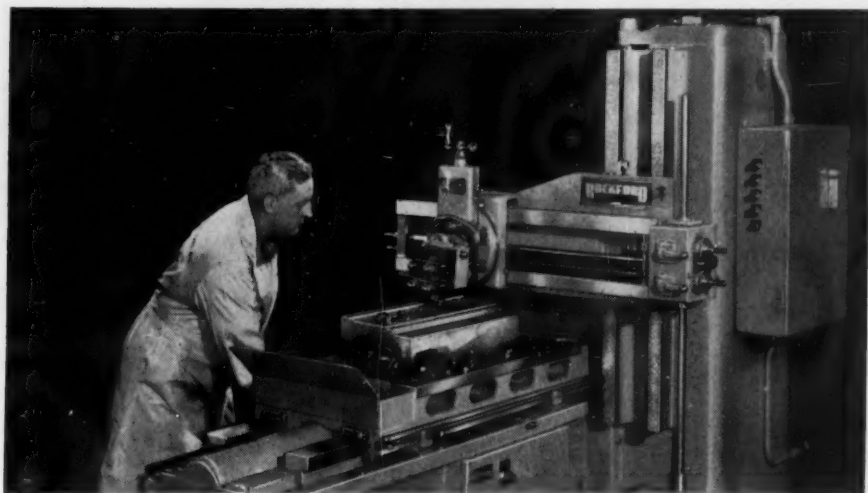
OHIO

how much does an openside shaper cost?

rockford hydraulic-driven 36" openside



shaper



you may be surprised to know that you can buy the 36" Openside Shaper for little more than the cost of a ram-type shaper.

Yet the 36" openside offers the advantages of planer accuracy and easy set-up, in addition to production flexibility. The standard machine complete with electrical equipment can be bought for as little as \$9,035.00. Side head, hydraulic tool lift and other accessories are extra at popular prices. Similar machines are also built in 48", 60" and 72" table lengths and priced accordingly. Consult your Rockford Machine Tool Co. representative for full details or write direct.



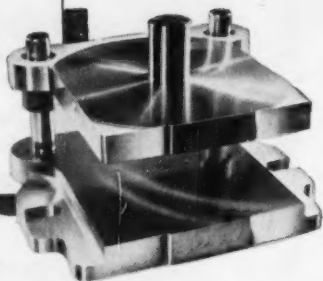
Get this handy time calculator for use in estimating machining time for shaping and planing operations. Request on company letterhead will bring one promptly.

OUR
52nd
YEAR

ROCKFORD MACHINE TOOL CO.

2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

World's fastest die set service in action



Now—Danly unites mass production techniques with the precision touch of craftsmanship to bring you the fastest die set service... ever.

Never before has there been a die set service as fast as the one that Danly now offers to you. Unique in concept, the system had its beginning some years ago when Danly originated its network of nationwide Danly Branches. Under such a system the main Danly Plant in Chicago provided thousands of interchangeable die set parts to Danly Branch Plants. It meant that such parts were easily assembled into standard die sets and then quickly delivered to meet the requirements of any tooling program. But, as buyers recognized the convenience of Danly service, demands on the Chicago Plant grew to exceed capacity. The solution? ... an unprecedented move in the die set field. Danly put die set manufacture on a mass production basis with no sacrifice of famous Danly precision. It was accomplished with amazing new facilities in the form of two complete production lines devoted exclusively to high speed, precision die set production. The next time you put one or a dozen Danly Die Sets on order, expect to get fast delivery from any Danly Branch, expect to get die sets unequalled in precision. You can expect it and you'll get it... when it's Danly.

Here's where faster die set service begins, on Danly's high speed precision production lines... the finest mass production facilities in the die set field.

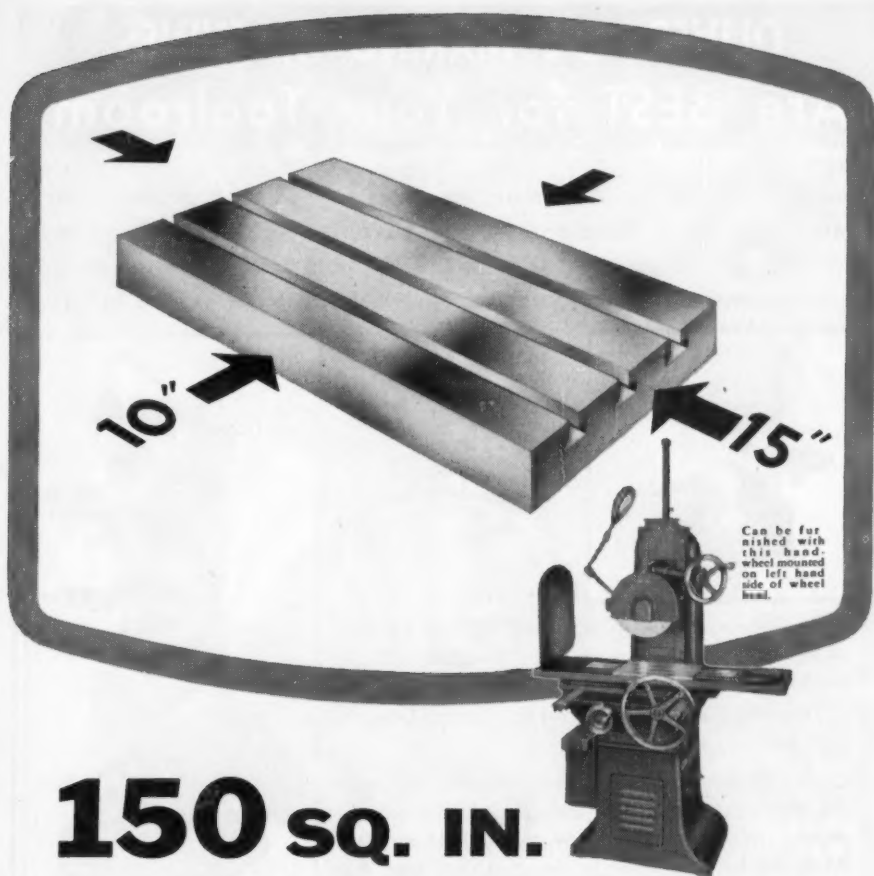


Fast, nationwide delivery from these plants

*CHICAGO 50	2100 S. Laramie Avenue
*CLEVELAND 14	1550 East 33rd Street
*DAYTON 7	3196 Delphos Avenue
*DETROIT 16	1549 Temple Avenue
*GRAND RAPIDS	113 Michigan Street, N.W.
INDIANAPOLIS 4	5 West 10th Street
*LONG ISLAND CITY 1	47-28 37th Street
*LOS ANGELES 54	Ducommun Metals & Supply Co., 4890 South Alameda
MILWAUKEE 2	111 E. Wisconsin Avenue
*PHILADELPHIA 40	511 W. Courtland Street
*ROCHESTER 6	33 Rutter Street

*Indicates complete stock.

Here's where your order is received... in one of Danly's Branch Plants. Because all die components are close at hand, your order is filled immediately.



150 sq. in. OF WORK SURFACE

ABRASIVE NO. 1½ TOOLROOM SURFACE GRINDER—a quality-built hand feed grinder—has the capacity your toolmakers need for their work—nearly 50% more than most small surface grinders. Abrasive No. 1½ is easy to work with—it's a big favorite with toolmakers throughout the

world. Thousands of these simple, efficient grinders are in service today—in tool and die shops, and in the tool departments of production plants. Send for Catalog giving complete details. Abrasive Machine Tool Company 20 Dunellen Road, East Providence 14, R. I.

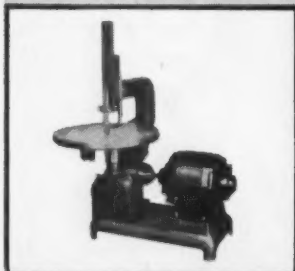
ABRASIVE

ACCURACY BOOSTS PRODUCTION

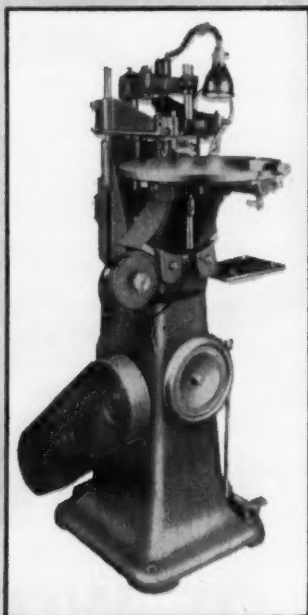
Abrasive Quality is Reflected in the Finish of Your Product

OLIVER DIE MAKING MACHINES Are BEST for Your Toolroom

Because . . . their efficiency, speed and accuracy in machine sawing, filing and lapping save time and cut costs up to 60%. Simple to operate, OLIVER DIE MAKERS further reduce costs because they do not require expensive, hard-to-get skilled labor.



**OLIVER
OF
ADRIAN**



For nearly 40 years OLIVER DIE MAKING MACHINES have proved invaluable on such jobs as production Filing, Experimental Work, Metal Patterns, Cams, Gages, Templates, etc.

OLIVERS have proved their worth in over 10,000 installations throughout the world. Many of these superior, long-lasting Die Makers have been in continuous use for more than 25 years.

OLIVER DIE MAKERS Available in 5 Models

The Bench Model S-1 (illustrated) is a single speed die maker for use on tool steel up to 1" thick.

The Heavy Duty Model (illustrated) has 6 speeds, works in metal up to 3" thick, has variable strokes to 5" with hydraulic feed.

**Write Today For Complete Technical Data on
OLIVER DIE MAKERS**

See our catalog in Sweet's Directory

MACHINE TOOLS by OLIVER include:

AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS
DRILL POINT THINNERS
TEMPLATE TOOL GRINDERS
FACE MILL GRINDERS
DIE MAKING MACHINES

OLIVER INSTRUMENT CO.

1430 E. MAUMEE • ADRIAN, MICHIGAN

TURN PIPE DREAMS INTO PIPE BENDS

Prices
start
as low as
\$1575.00

•
(Motor and all
Electrical
Equipment
included)

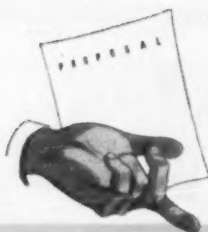


Pipe, tube and structural bending is now simplified with a PEDRICK PRODUCTION BENDER. Heretofore difficult bends, such as offsets and off-plane bends, can now be made in production quantities at an amazingly low cost. ALL PEDRICK PRODUCTION BENDERS are complete with motor, and are equipped with automatic duplicate bending relays.

Write for Descriptive Folder. Dept. 5.

PEDRICK TOOL & MACHINE CO.

3640 N. LAWRENCE ST., PHILADELPHIA 40, PA., U.S.A.



*Here's another reason
it pays to get a proposal
from Fosdick*

"Lathe Bed Production Time Slashed 6 hrs."

"Since installing our new FOSDICK"...

says Sidney Machine Tool Co.

"Our new Fosdick Radial is easy to handle, requires less time for job set-ups. And its operating advantages are numerous. Formerly, we put 28 hrs. into drilling our 28' lathe bed. But with our new Fosdick Radial Drill, we've cut drilling time by 6 hours... saved valuable production time! We've found that it pays to get a proposal from Fosdick."

*Fosdick Hydraulic Radials are available
with 3' to 8' arms, 11" to 19" columns.
For full information, ask for Bulletin ATS.*

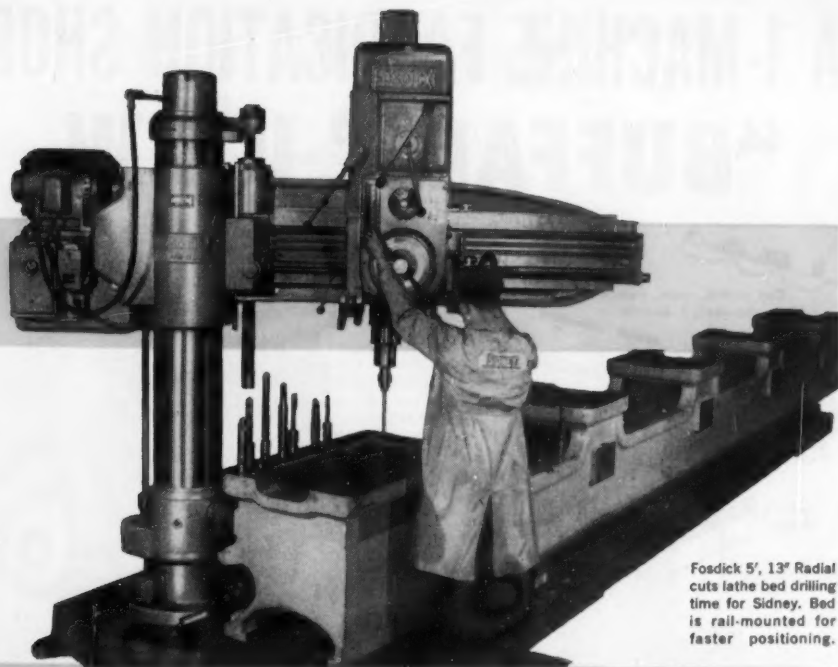
Fosdick Radials give Faster Drilling...



Close-up of Fosdick hydraulic column clamp. Note the sliding shoe design which gives it straight-line clamping action.



Radial Drills



Fosdick 5', 13" Radial cuts lathe bed drilling time for Sidney. Bed is rail-mounted for faster positioning.

More Rigidity . . . Easier Handling.

Fosdick Radials give you many features that insure fast, rigid, precision drilling. To name a few:

Hydraulic Column Clamp. New sliding-shoe design gives rigid straight-line clamping action. Prevents side movement of column for sustained accuracy and speed of drilling.

Locking Control. With this feature, set-up time is reduced to a minimum. When feed mechanism is engaged, an automatic interlock clamps the head and the column. When feed is disengaged, clamping is maintained. This permits the operator to change tools without disturbing the position of the head. Clamping is disengaged by independent levers.

Tool Ejector. For speedy tool removal all the operator has to do is to move the spindle to its extreme upper position. This automatically disengages the tool. No drifts or hammers necessary.

Automatic Positioning Table. Now, available for use with radial drills! Without jigs, the Fosdick Automatic Positioner makes possible exact reproduction of precision drilled, bored, tapped and reamed parts . . . within tenths! For details write for Bulletin AT-A.

Need Drilling Equipment? Get a Proposal from Fosdick!



Jig Borer



Sensitive and Upright Drills



Sensitive Radial Drills



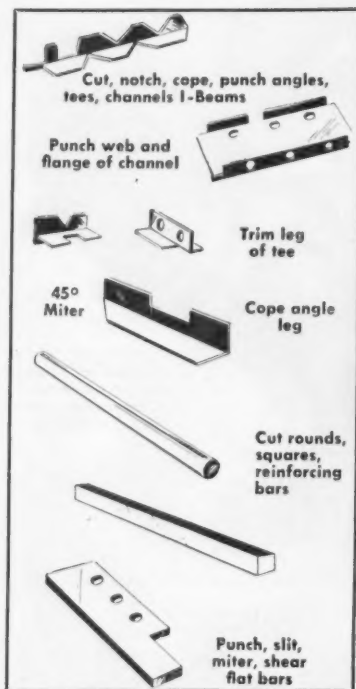
Automatic Positioning Machines

THE FOSDICK MACHINE TOOL CO., CINCINNATI 23, OHIO

FOSDICK

A 1-MACHINE FABRICATION SHOP

"BUFFALO" U.I.W.



CUTS—PUNCHES—SHEARS—SLITS—
MITERS your structurals without
changing tools!

For fabrication of a wide range of structural members, you'll find a "Buffalo" Universal Iron Worker a regular machine shop! Yet it takes only the space of one machine, and two operators can turn out work simultaneously—at a production clip, one at the punch head, the other at the shear or bar cutting head. Rugged electrically welded steel plate frame, not cast iron. Handy hold-downs. Easy, one-shot centralized lubrication system in most models. Five models to handle your requirements. **WRITE NOW** for Engineering Bulletin, stating range of shapes and sizes to be fabricated.



BUFFALO FORGE COMPANY

388 BROADWAY BUFFALO, NEW YORK
 CANADIAN BLOWER & FORGE Co., LTD., Kitchener, Ont.

DRILLING • PUNCHING • SHEARING • BENDING

HEAVY LOAD / LIGHT WORK

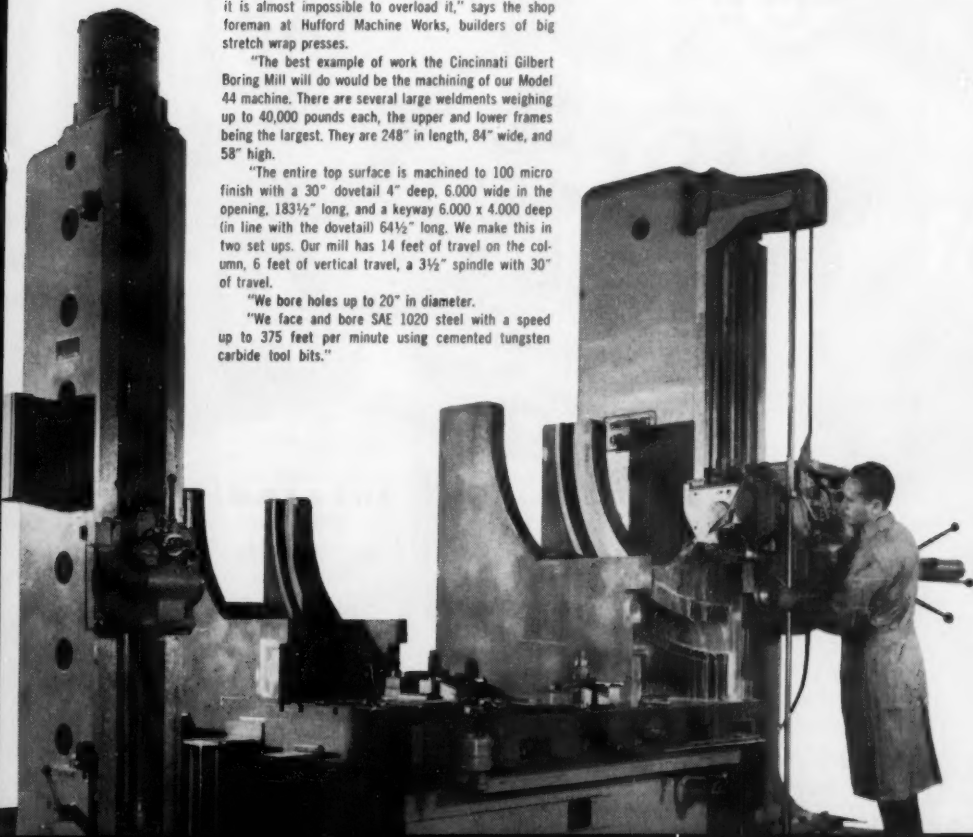
"The thing I like about the Cincinnati Gilbert is that it is almost impossible to overload it," says the shop foreman at Hufford Machine Works, builders of big stretch wrap presses.

"The best example of work the Cincinnati Gilbert Boring Mill will do would be the machining of our Model 44 machine. There are several large weldments weighing up to 40,000 pounds each, the upper and lower frames being the largest. They are 248" in length, 84" wide, and 58" high.

"The entire top surface is machined to 100 micro finish with a 30" dovetail 4" deep, 6,000 wide in the opening, 183½" long, and a keyway 6,000 x 4,000 deep (in line with the dovetail) 64½" long. We make this in two set ups. Our mill has 14 feet of travel on the column, 6 feet of vertical travel, a 3½" spindle with 30" of travel.

"We bore holes up to 20" in diameter.

"We face and bore SAE 1020 steel with a speed up to 375 feet per minute using cemented tungsten carbide tool bits."



Centralized controls, frictionless response, maximum flow of power from motor to tool make light work of heavy loads on a Gilbert, Hufford uses a floor type machine with sliding table. Many other arrangements are available. Write for literature on these versatile machines.

GILBERT

THE CINCINNATI GILBERT MACHINE TOOL COMPANY • 3366 BEEKMAN STREET, CINCINNATI 23, OHIO

one *American* broaching machine

<p>SURFACE BROACH REMOVES 3/16"</p>  <p>150 PIECES PER HOUR</p>	<p>INTERNAL BROACH REMOVES 1/32"</p>  <p>200 PIECES PER HOUR</p>	
--	---	---

surface and internal broaching possible with *American* 3-way machine

To broach the lugs and cross holes of a universal joint, American engineers designed a combination tooling set-up on a standard American T-10-36 3-way machine.

Arranged with 3 stations, the machine surface broaches 3/16 stock off the inside and outside surfaces of the lugs at the center station; or broaches 1/32 off the I. D. of the lug cross holes at the two outer stations.

For more information on your particular broaching problem send a part-print or sample and hourly requirements. Address Dept. MM.

For more information on American
Machines send for Catalog #300.



***American* BROACH & MACHINE CO.**
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

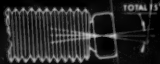


Here's the secret to
positive clamping...
freedom from marring!

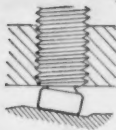


the New Vlier

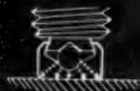
SCREW-BALL CLAMPS!



Ball-bearing construction insures frictionless, automatic angle adjustment and rotation; pad swivels freely in all directions up to 7½° from the centerline!



Pad seats firmly on work surface within angular range!



Force distributed equally to pad face. Conical seat distributes force equally in all directions; insures easy alignment in angular applications; greater freedom of motion.



Pad inserts from top of threaded hole or from bottom for easy installation!



Large pad area. Pad is machined from the solid, not counter-bored or relieved; has greater strength plus freedom from distortion!

NO MORE EXPENSIVE, CUSTOM-MADE SWIVEL PADS — 17 size variations; 1" O.D. up; N.C. threads; class 2 fit

LOW COST... Saves hundreds of dollars annually in toolmaker's time!

NO MARRING — Rotation of pad swivels at first touch against the work! Soft seat stress surfaces!

HER SOCKET HEAD... for easy hex key adjustment!

BLACKS THE ACE OF SPADES! Completely rust proof, end to end!

KEEP VLIER SCREW-BALLS IN STOCK FOR INSTANT USE — SAVE YOUR TOOLMAKER'S TIME!

Ask your Vlier Distributor for an assortment of sizes today!



VLIER ENGINEERING
INCORPORATED

MONEY-SAVING TOOLING SPECIALTIES FOR EVERY REQUIREMENT!



TORQUE THUMB SCREWS — Apply accurate, controlled end pressures; eliminate distortion to the workpiece. 4 models; 19 sizes!



VLIER SPRING PLUNGERS — For use wherever accurate, positive spring loads are needed! 4 models; 40 sizes!



VLIER SPRING STOPS — Provide end pressures in fixtures when wall sections are not available. Two models: 14 and 32 lbs. end pressure.



VLIER TOGGLE PADS — Assure solid clamping of parts with uneven or off-angle surfaces. 5 sizes; fit almost any clamp.

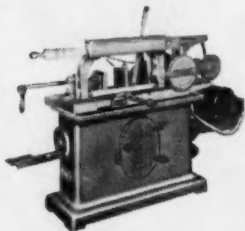
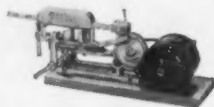


VLIER FIXTURE KEYS — New 5-Way Key fits every standard mill table slot. 3-Way model also available.

Write for your complete catalog of Vlier products today! It's free!

Select the ***RIGHT*** Saw

WHATEVER YOUR REQUIREMENTS ARE,
from the small 3½" x 3½" capacity to the large
9" x 9" size, there are 10
models of the KELLER
POWER HACK SAW to
choose from. Each with a
record of excellent per-
formance and trouble-free
operation . . .



to meet your needs and ***SAVE!***

KELLER *Power* HACK SAWS

From \$71.50 including motor, and up.
You save not only on the initial invest-
ment, but continue to save because of the
low operating and maintenance costs,
and longer blade life. KELLER POWER
HACK SAWS have the automatic lift,
two speeds, and a production rate of 80
to 140 strokes per minute. Truly a small
investment for an item that gives such
large dividends.

10 MODELS TO CHOOSE FROM



Gentlemen:

Please send me bulletin 1052 that gives com-
plete data on all Keller's 10 Models.

Name.....
Company.....
Address.....
City..... State.....



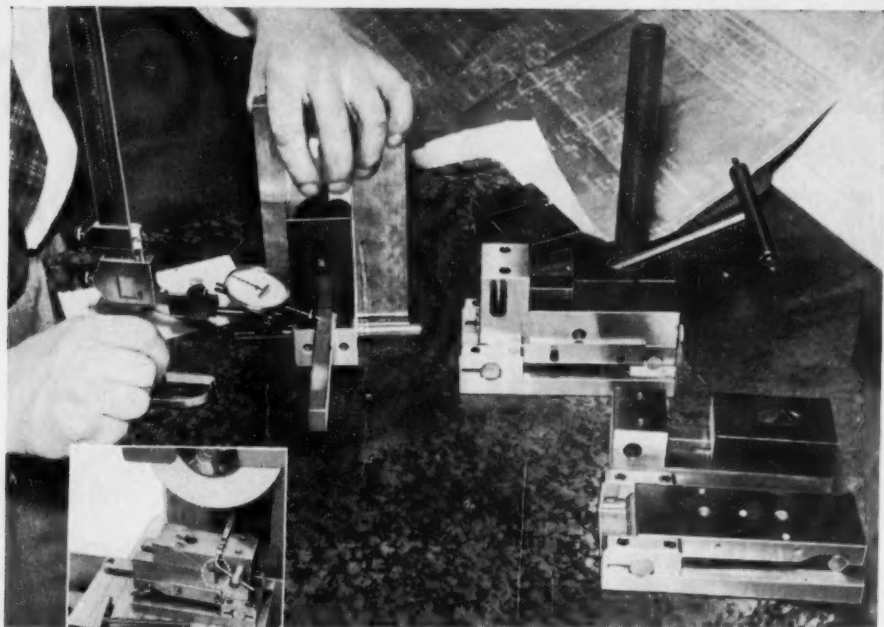
**MAIL
TODAY!**

Sales Service Machine Tool Co.

PRESS RITE PRESSES • SHAPE RITE SHAPERS • KELLER POWER HACK SAWS

2355 UNIVERSITY AVENUE • ST. PAUL 4, MINNESOTA





QUALITY CONTROL CHECK AT FACTORY. READING OF "ONE-TENTH" INDICATOR READS 0 ALONG 6" OF THE PARALLEL. NOTE ADJUSTABLE STOP (See Insert).

New J & S Precision Grinding Vise square within 0.0001" or less in 1" in 4 positions

**Hardened, Ground and Lapped—Deep Frozen for Stabilization—
Holds Tapered Diameters and Odd-shaped Workpieces**

For inspection, grinding, milling, drilling and tapping, jig boring, layout work . . .

This new J & S "Square-perFect" Vise is one of the most practical precision vises ever developed. Its many helpful features explain why:

It is square, for example, with 0.0001" or less in 1" in 4 positions. It is attachable to J & S 5" sine bar with 0.100" recess for small angles.

Accurate, Adjustable Stop

Like all J & S workholding tools, it has a unique downholding clamping action. This assures dependable, accurate positioning of workpieces. An adjustable stop provides fast, sure positions for repeat operations. Workpieces can be loaded and unloaded rapidly.

Holds Tapered, Odd-shaped Workpieces

The clamping jaw of this J & S Precision Grinding

Vise swivels to permit holding of tapered and odd-shaped workpieces. It holds round stock from 1/8" to 2 1/2" in diameter in Vee-block fashion. The range of jaw openings is from 0" to 3".

Get all the facts without delay. Fill-in the coupon and mail it today.

J & S TOOL CO., INC.,

W. Mt. Pleasant Avenue, Livingston, N. J.

Please send me complete information on your J & S Precision Grinding Vise.

NAME

COMPANY

STREET

CITY STATE

J & S
TOOL CO. INC.

WHEEL DRESSERS • JAW CLAMPS • PRECISION VISES • SINE BARS • DOWN-HOLDING DEVICES

645 W. MT. PLEASANT AVENUE

LIVINGSTON, NEW JERSEY

June, 1954

MODERN MACHINE SHOP 47

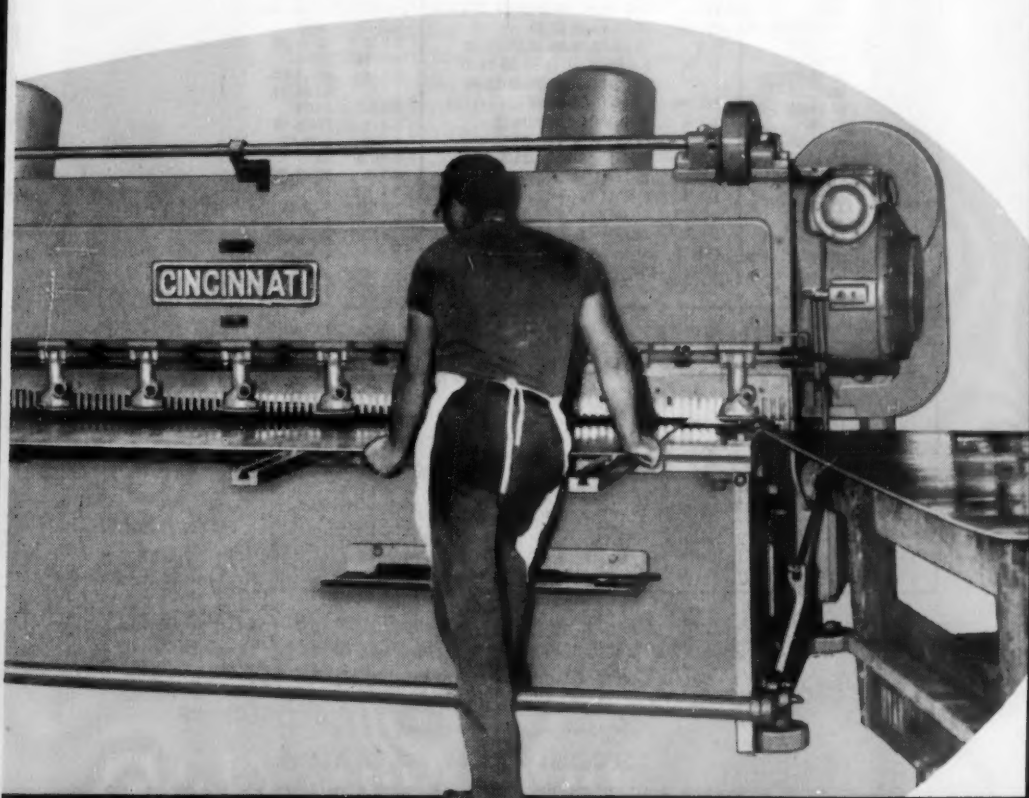
modern machines MAKE modern furniture...



Photos courtesy The Troy Sunshade Company, Troy, Ohio

In this modern furniture factory, modern Cincinnati Shears give an accurate, economical and versatile performance. Ease of operation, rapid, simple gauging, holding work securely and clean cutting, all speed production and reduce costs.

Write for Cincinnati Shear Catalog S-6.



THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES



SPECIAL TAPS!

...for Immediate Delivery

HIGH SPEED **SPECIAL** RIGHT HAND TAPS

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
4	32-48-60-64	3/8	12-16-18-20-27-28-32-36-40-48	1-3/4	8-10-12-14-16-18-20-24
5	30-32-36-48-80	7/16	12-16-18-22-24-27-28-30-32-36-40	1-13/16	8-10-12-14-16-18-20
6	36-40-48-56-60			1-7/8	8-10-12-14-16-18-20-24
7	32-40-48	1/2	12-14-16-18-22-24-26-27-28-30-32-36-40	1-15/16	8-10-12-14-16-18-20-24-28
8	24-30-36-38-40-44-48	9/16	16-20-24-27-28-30-32-40-48	2	4 1/2-8-10-12-16-18-20
9	24-28-32-40-48	5/8	12-14-16-20-24-27-28-32-36-40	2-1/16	12-14
10	28-30-36-40-48-64	11/16	11-16-18-20-24-27-28-30-32	2-1/8	12-16-20
12	20-28-32-36-48	3/4	9-11-12-14-16-20-24-26-27-28-32	2-3/16	12-16
14	20-24-28	13/16	10-14-18-20-27-32	2-1/4	4 1/2-8-12-14-16-18
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5/64	36-48-72	15/16	8-9-10-12-14-16-18-20-24-32	2-3/8	12-16-18
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7/64	48-56-60	1-1/16	12-14-16-18-20-24	2-9/16	18
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5/32	32-36-40-48	1-3/16	8-10-12-14-16-18-20-24	2-3/4	16
9/64	36-40-48	1-1/4	8-10-14-16-18-20-24-32	2-7/8	8-12-16
11/64	36	1-5/16	12-14-16-18-20-24-32	3	8-16
3/16	20-24-32	1-3/8	8-10-14-16-18-20-24	3-1/4	8-12-16
13/64	32-36-48	1-7/16	8-10-12-16-18-20-24	3-1/2	8-12-16
7/32	24-28-32	1-1/2	8-10-14-16-18-20-24-28	3-7/8	6
1/4	18-24-26-27-30-32-36-40-48	1-9/16	18-20-24-36	4	8-12
5/16	16-20-22-27-28-32-36-40	1-5/8	5 1/2-8-10-12-13-16-18-20-24		
		1-11/16	10-12-14-16-18-20-24		

HIGH SPEED LEFT HAND TAPS

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
0	80	3/8	16-24-32	1-3/8	6-8-10-12-16-18-20-24
1	56-64-72	7/16	14-20-28	1-7/16	8-10-12-14-16-18-20
2	56-64	1/2	12-13-20-28	1-1/2	6-8-10-12-16-18-20
3	56	9/16	12-18-20-24	1-9/16	8-10-12-16-18-20
4	32-36-40-48	5/8	11-12-18-20-24	1-5/8	8-10-12-14-16-18-20
5	40-44	11/16	11-16-24	1-11/16	8-10-12-14-16-18-20
6	32-36-40	3/4	10-16-18-20	1-3/4	8-10-12-14-16-18-20
8	32-36-40	13/16	16	1-13/16	8-10-12-14-16-18-20
10	24-30-32-40	7/8	9-12-14-18-20	1-7/8	8-10-12-14-16-18-20
12	24-28-32	1	8-12-14-16-18-20	1-15/16	8-10-12-14-16-18-20
1/4	20-28-32	1-1/8	7-12	2	4 1/2-10-12
5/16	18-20-24-28-32	1-1/4	7-12-16-18		

LEFT HAND AND SPECIAL DIES IN STOCK

Prices on Application

New Sizes Added Frequently

NOTE:

Override taps. Special size reamers. H.S. extension drills. H.S. Taper length drills No. 1 to No. 60—Letter sizes A. to Z. Fractional sizes 1/4" to 1 1/2" 12" Overall 9" flute length. H.S.S. aircraft drills 6" and 12" long. We Specialize In High Speed Cutting Tools

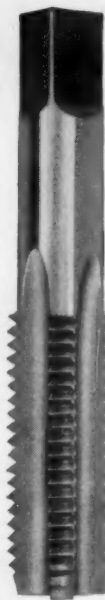
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WESTERN TOOL SUPPLY COMPANY

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Phone: RAndolph 6-4113

MONTHLY BULLETINS AVAILABLE



ELGIN PRECISION

for more than 50 years

Automatic Production Air Feed Lathes

TURNING • FACING • BORING



The Elgin High Production Air Feed Lathe is a new design, resulting from many years of experience in the precision machinery field. Its outstanding features are, High Precision, Efficiency, Simple Operation, Rigid Construction. The carriage is pneumatically—hydraulically powered in an automatic cycle for maximum accuracy and production.



Spindle Speeds
to 4000 R. P. M.
17" Swing
17" Between Centers
3/4" H. P. Motor
1" Collet Capacity

ELGIN TOOL WORKS, Inc.

1771 Berteau Avenue

Chicago 13, Illinois

June, 1954

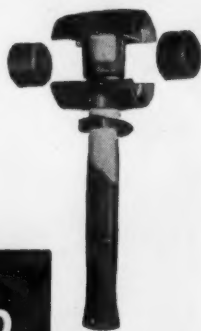
MODERN MACHINE SHOP 51

The best "soft" hammer your money can buy!



Tough, resilient water buffalo faces deliver plenty of power with full protection for delicate parts and finishes. Faces are easily replaced, and comfortable Safety-Flare handle gives you non-slip grip. Work goes better with a C/R RAWHIDE Jaw-Head. See for yourself.

**CHANGE FACES
IN SECONDS**



- Available from leading industrial suppliers.
Also C/R Rawhide mallets and Rawhide mauls.
For further information write Dept. 22

CHICAGO *Rawhide* MFG.CO.

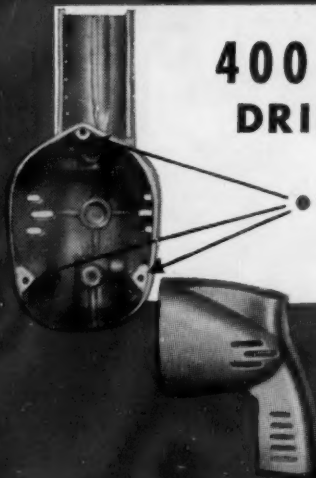
1301 Elston Ave.

Chicago 22, Illinois

In Canada: Super Oil Seal Mfg. Co., Ltd., Hamilton, Ontario

AN A33A NATCO PROVIDES
High Production plus Flexibility

FOR THOSE SMALL PARTS



**400 SMALL PARTS
DRILLED or TAPPED
PER HOUR**

- THREE .1065 HOLES DRILLED
OR TAPPED 6-32 TAP
IN HAND DRILL HOUSING

**JUST ONE OF MANY PARTS
drilled and tapped
on these NATCO High-Speed
adjustable A 33 A machines**

Another example of
light sensitive machines

**NATCO
ENGINEERED**
for Quality
and Quantity
Production



NATCO DRILLING, BORING, FACING AND TAPPING MACHINES



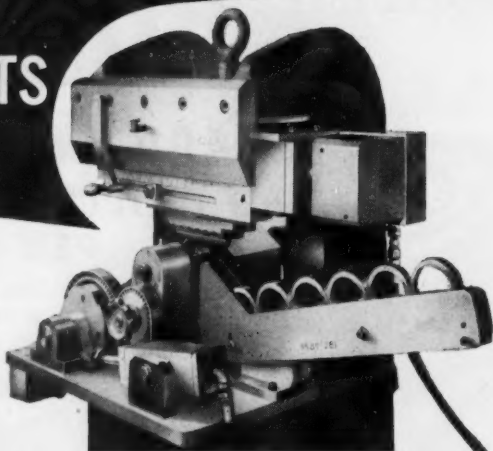
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Branch Offices: CHICAGO, 2009 Engineering Bldg. • DETROIT, 409 New Center Bldg.
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Call a Natco Field Engineer


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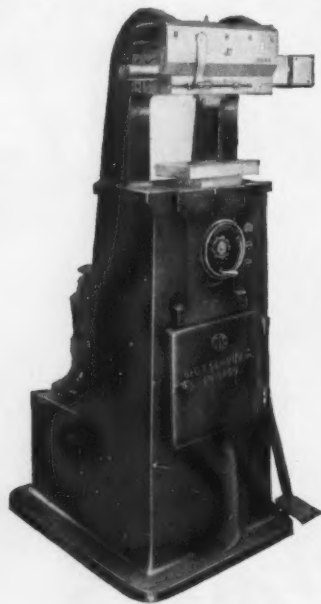
GEO. T. SCHMIDT AUTOMATIC FEEDS



In many applications, thousands of components per hour are marked, with  automatic marking equipment. Feeding mechanisms are designed for a specific operation, custom tailored to suit your requirements.

Perhaps  specialists can design automatic equipment to solve your marking problems.

A trained marking engineer is at your disposal to help you modernize your marking operations and cut costs to a minimum.



MODEL 175 HYDRAULIC



The unit illustrated above marks the periphery of bearing races at the rate of 2400 to 3000 per hour. It is fed directly from automatic screw machines, and requires no operator.

IF IT'S WORTH MAKING, IT'S WORTH MARKING.

GEO. T. SCHMIDT, INC.
1806 West Belle Plaine Avenue
Chicago 13, Illinois

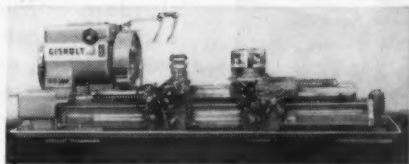


**"Here's why GISHOLT insists upon
the **HEAVIEST CASTINGS!**"**

Look at them... castings for the heaviest saddle type turret lathes in the business! Look at all the angles:

First, note how the headstock is cast integrally with the bed for perfect spindle alignment... how cross supports give the most solid base for carriages, tools and slides... how extra-heavy webbing gives the headstock the ruggedness to support powerful gear train members.

Remember, too, that cast iron absorbs vibration. The heavier the better! And Gisholt controls the quality of the finest nickel semi-steel in its own foundry.



The Gisholt 5L Saddle Type Turret Lathe has a net weight of 22,500 lb. without equipment.

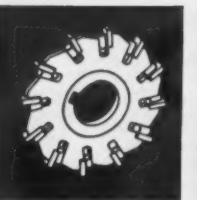
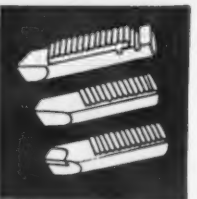
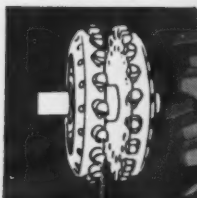
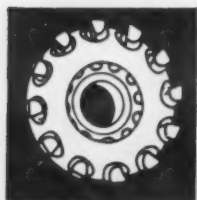
What does it mean to you? You can load up your Gisholts with carbides and really turn out the chips! You've got the strength, the rigidity and the freedom from vibration to take all the speed you can get from today's carbides—with the heaviest feeds—and still have the safety margin to take care of tomorrow's tool bit developments.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin

THE GISHOLT ROUND TABLE
represents the collective experience of
specialists in the machining, surface-finishing
and balancing of round and partly round
parts. Your problems are welcomed here.



TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



24" dia.

is no problem!

...what's more, Lovejoy is set to give good delivery. Lovejoy's large engineering staff and modern plant offer every facility for production of any size standard or special milling cutter. Our 35 years' experience can help you get the best results, economically, on all milling operations. And, no matter what the age of your Lovejoy housings, blades of H.S.S., alloy and carbide are promptly available from stock!

Write for free catalog.



130 MAIN ST., SPRINGFIELD, VERMONT

LOVEJOY
TOOL COMPANY, INC.

**Improve your product quality
with precision lapped parts!**



Enlarged Norton job lapping service

Complete and modern in every detail, the new Norton Job Lapping Department is ready to finish parts to your exact specifications.

Here, Norton machines for every type of lapping are operated by expert personnel. Results are checked on the latest inspection equipment, while precision accuracy is further assured by careful atmosphere control. Extensive job-range covers the following:

Materials — Practically unlimited in range, including hardened steel, stainless steels, stellite facings, cast iron, non-ferrous pressed and die-cast parts.

Types of Lapping — Single and parallel face flat lapping, to specifications ranging from stock removal to optical flatness. Also, external cylindrical lapping to high precision requirements.

Workpiece Capacities — Flat work up to 24" across. Cylindrical work from $\frac{1}{4}$ " diameter by $\frac{1}{4}$ " long to 2" diameter by 8" long.

The entire project is under direct supervision of Norton Lapping Engineers, pioneers in the development of mechanical lapping processes and machines. They are prepared to work out the best lapping techniques for your requirements. For full details, see your Norton Representative or write us direct. NORTON COMPANY, Machine Division, Worcester 6, Mass.

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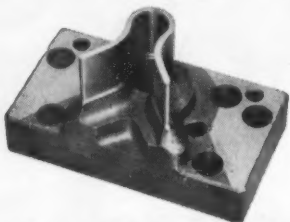
PLUS *ACCURACY*

WITH MOORE JIG GRINDERS



HOLES from 1/64" to 8" Relocated and Ground within .0001" in One-Third Previous Time

Before hardening, this two-station die block was Moore-Jig-Bored to eliminate the need for excessive grinding. After hardening and surface grinding, all holes were Moore-Jig-Ground to exact size and location. Blank hole and center piercing hole were ground with 1/2" included taper. Little clearance could be allowed between punch and die. Jig grinding time: *only 2 1/4 hours.*



CONTOURS, Too, Accurately Jig Ground and Checked in One Setting

This flanged punch, impractical to grind by any other method, was a natural for the No. 2 Moore Jig Grinder. All radii—male and female—were ground accurately to location and size. The piece, having been set up on a rotary table, was aligned to permit grinding of the angular surfaces. And the entire contour was inspected by the "indicator measuring" method while the punch was still on the machine.

The word "versatile" must have been coined for the No. 2 Moore Jig Grinder. Not only does this machine relocate and grind straight and tapered holes with ease, but it contour grinds, chop grinds and slot grinds just as skillfully.

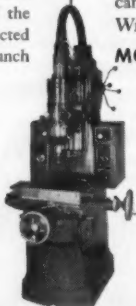
The Moore Jig Grinder, together with its tool-room teammate, the Moore Jig Borer, enables tool and die sections to be produced concurrently, puts diemaking on an interchangeable-parts-and-assembly basis. And it's also a time-saver on production jobs.

Employing the accurate lead screw measuring principle and a convenient system of coordinate hole location, the fast and sure Moore Jig Grinder eliminates hours of checking on bench and surface plate.

Why not find out how this remarkable machine can save *you* sizeable chunks of time and money. Write today for our detailed bulletin.

MOORE SPECIAL TOOL COMPANY, INC.

730 Union Ave., Bridgeport 7, Conn.

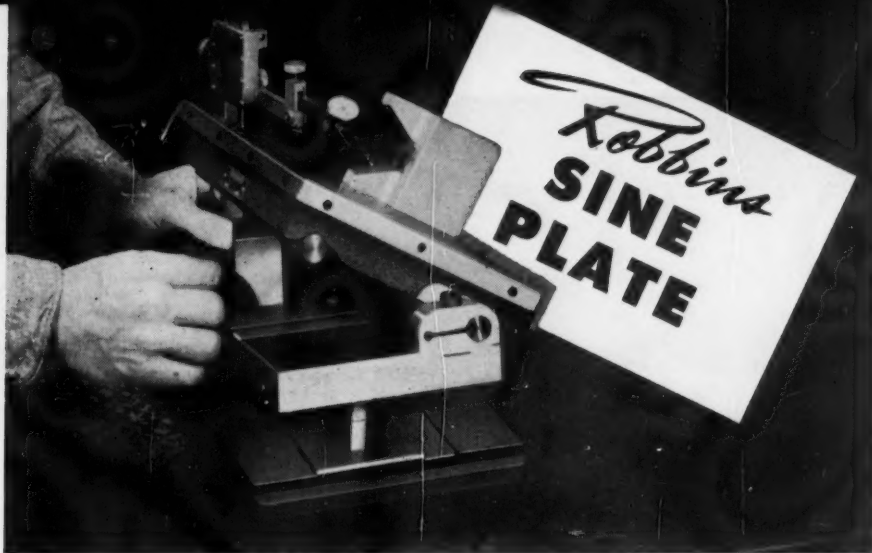


NO. 2 MOORE JIG GRINDER

Range 10" x 16" x 16" height. Grinding speeds from 12,000 to 60,000 rpm. Infinite feeds up and down; spindle-housing heat control. Features slot grinding attachment.

ADD  TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • DIE FLIPPERS • MOTORIZED CENTERS • HOLE LOCATION ACCESSORIES



FAST ANGULAR INSPECTION SET-UPS **... with repetitive accuracy**

You can save hours of set-up time and be certain of accuracy on *all* your angular inspections with Robbins Sine Plates.

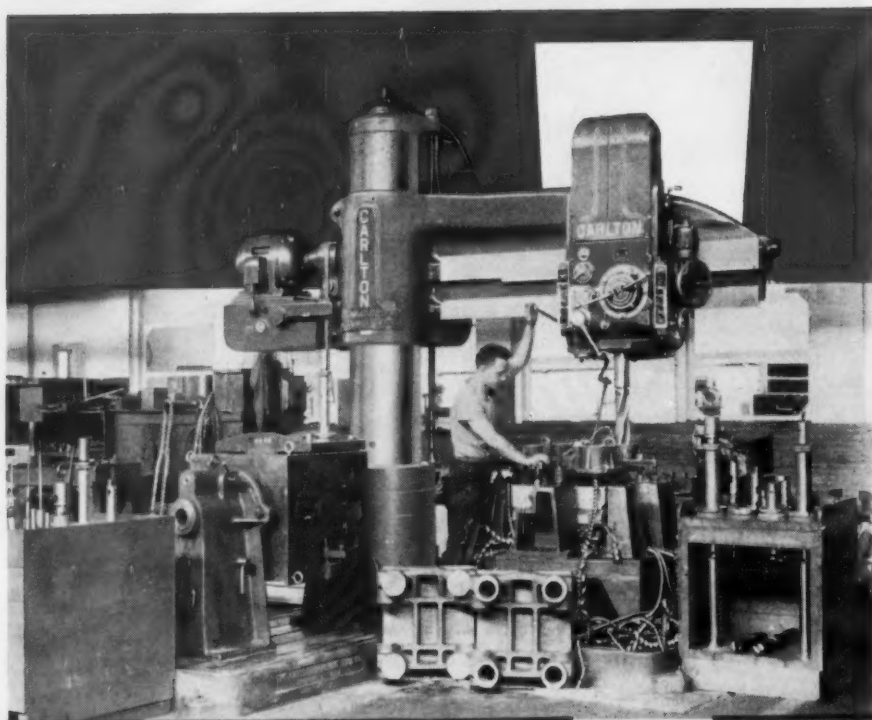
Any desired angle (single or compound) can be quickly and easily set up by using standard gauge blocks. Referring to the handy table that is supplied with each unit, it is simple to select the proper blocks.

Robbins Sine Plates are made of hardened steel, built to commercial precision tolerances on the sine bar method. Gauging surfaces are ground and lapped with tapped holes in the top plate to clamp the work piece. Thousands are in daily use.

Get complete details on Sine Plates and other Robbins precision engineered products. Write for your free illustrated catalog and price list today.

OMER E. Robbins COMPANY
Dept. B-3 • 24800 PLYMOUTH ROAD • DETROIT 28, MICHIGAN

Also producers of special gauges and fixtures



Carlton

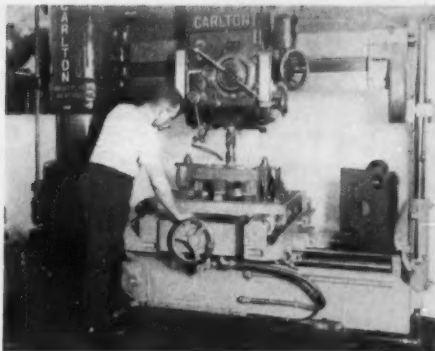
RADIAL DRILLS

Revolving Stands used under Carlton radial drills reduce boring and drilling costs 24.3% at Reed-Prentice Corp., Worcester, Mass. In the photo directly above, the Carlton radial has a double right-angle base which permits operator to work on the job at right while the one on the other base is being set up. This arrangement keeps the spindle drilling continuously.

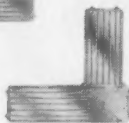
Carlton Radial Drills are perfectly suited to production drilling, and when properly tooling, can reduce costs considerably over the horizontal method. The pushbutton control simplifies and speeds up operation. The low hung drive assures the necessary rigidity. And the accuracy and precision with which the Carlton column clamp performs eliminates needless clamping and unclamping.

Drilling versatility and accuracy.

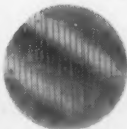
Holes from 5" to $\frac{3}{8}$ " in diameter are drilled in this set-up which shows a Bullard Man-Au-Trol spacer mounted on a 4A Carlton radial drill. Using the guide, the operator drills and bores a 5" center hole and two 4" tie-bar holes, and drills and taps 24 small holes in this Reed-Prentice plastic injection molding machine die plate.



4-WAY BASE



RIGHT-ANGLE BASE



FULL-ROUND BASE

..... Variety of bases fit all production hole drilling requirements.

Carlton radial drills can be furnished with any of seven different types of stationary bases, three of which are shown here. And, there's a special track type mounting and a variety of plain or uni-tilt tables and revolving jigs . . . so that with Carlton you're sure to get the most efficient and profitable set-up for your requirements.

Cut Costs 24.3% at Reed-Prentice

Carlton Engineered . . . Carlton Tooled.

Carlton engineers will be glad to work with your engineers in recommending the most efficient tooling for your Carlton radial drill . . . in making time studies and furnishing tooling costs. Just send us your requirements and we'll submit our recommendations promptly and without obligation.

Use convenient coupon. The Carlton Machine Tool Co., Cincinnati 25, Ohio.

Gentlemen: Send us your recommendation on how the Carlton radial drill, properly tooled, can save us money on the attached drilling requirements.

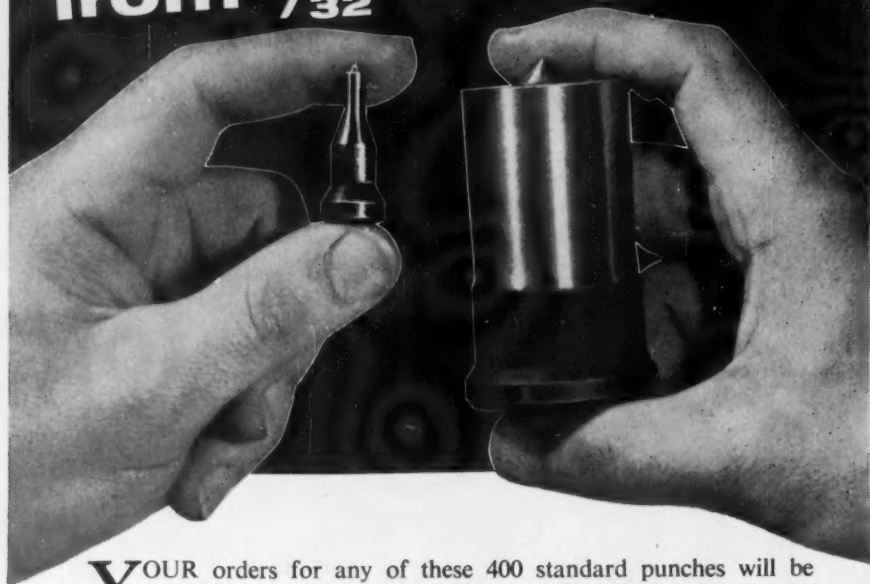
Name

Company

Address

City Zone State

400 Standard Cleveland Punches from $\frac{5}{32}$ " to $1\frac{1}{2}$ "



YOUR orders for any of these 400 standard punches will be filled promptly from stock. Naturally they cost less than special punches. What's more, when you order Cleveland punches you're sure of getting quality tools backed by years of specialized experience. We're constantly experimenting with various steels and processes so that we can give you the very best.

Are your punching machines equipped to use standard Cleveland punches? If not, it will pay you to investigate the many advantages of standardization. For detailed information send for our new Catalog No. 12 today!



A-9223



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POWER PRESSES — FABRICATING TOOLS

City Foundry Division • Small Tool Department

E. 40th & St. Clair Avenue • Cleveland 14, Ohio

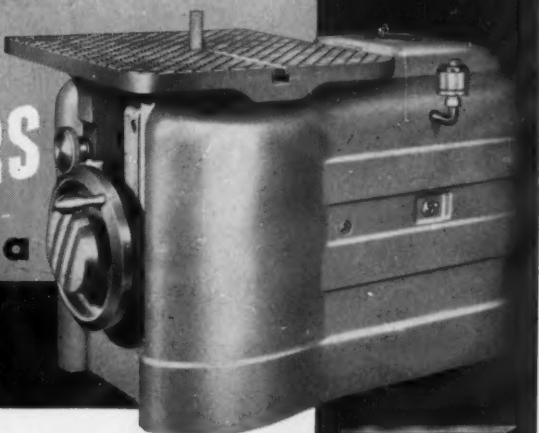
NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • E. LANSING • OXFORD, O.

grinding and fitting

**DIFFICULT
CONTOURS**

is EASY with a

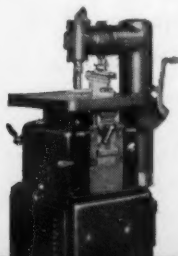
**BOYAR-SCHULTZ
No. 1 Profile Grinder**



A Bench model with Spindle speed of 20,000 R.P.M., Boyar-Schultz No. 1 Profile Grinder is a rapid Stock remover.

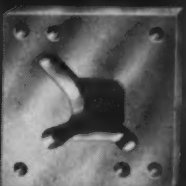
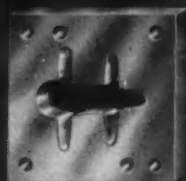
An ideal machine tool for grinding and fitting irregular inside and outside contours and profiles such as die clearances and many other grinding jobs that would otherwise require time consuming set-ups. A real time-saver, performing in minutes many jobs that formerly required hours.

Accommodates wheel $\frac{1}{8}$ " to 1" diameters.



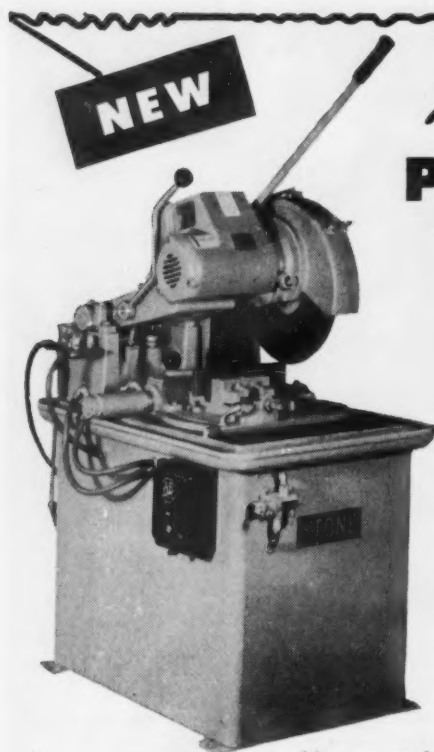
**Boyar-Schultz
No. 2 Profile Grinder**

For grinding and fitting large dies and punches such as forming dies for refrigerators, tables, sanitary ware and other large work. Spindles turn at 10,000 R.P.M. Accommodates wheels $\frac{1}{4}$ " to 3" diameters.



BOYAR-SCHULTZ CORPORATION

2120 WALNUT STREET, DEPT. C-J, • CHICAGO 12, ILLINOIS



Automatic
POWER-FED
Cutting
Head

for STONE
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AUTOMATIC CUTTING

You Save
up to 25%
on wheel
costs with
power feed!

Now—quicker—safer—cutting with controlled feeds, gives even greater efficiency to Stone High-Speed cutting equipment. The automatic feed improves the quality of cut, eliminates operator fatigue, increases production rates and increases wheel life.

AVAILABLE AS OPTIONAL EQUIPMENT ON NEW MACHINES OR AS SEPARATE UNIT FOR INSTALLATION ON PRESENT MACHINES.

Write Today For
Complete
Information



STONE MACHINERY Co., Inc.

Fayette St. Manlius, N. Y.

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HARTFORD
Special
SUPER-SPACERS

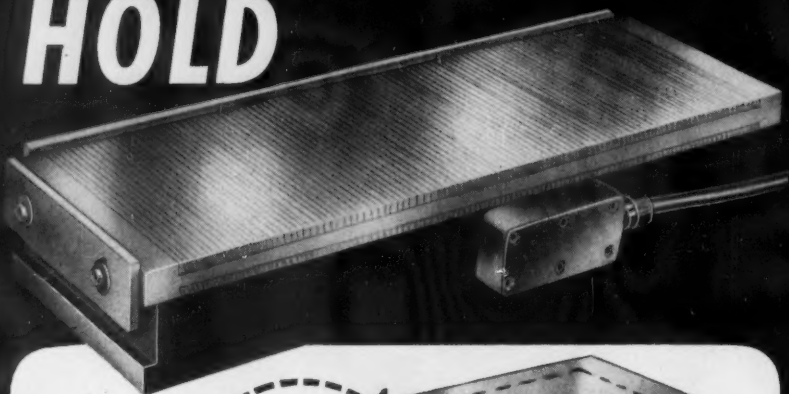
THE HARTFORD SPECIAL MACHINERY CO., HARTFORD 12, CONN.

Magna-Lock

ELECTRO-MAGNETIC

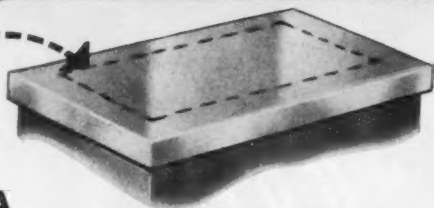
CHUCKS

HOLD



22% MORE HOLDING AREA

Fine poles permit
holding small work
pieces, too.



This extra margin of holding power
holds an extra margin of profit
for you!

Request Magna-Lock as original equipment on your new machines.

Get details, DEPT. MM-64

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Magna-Lock

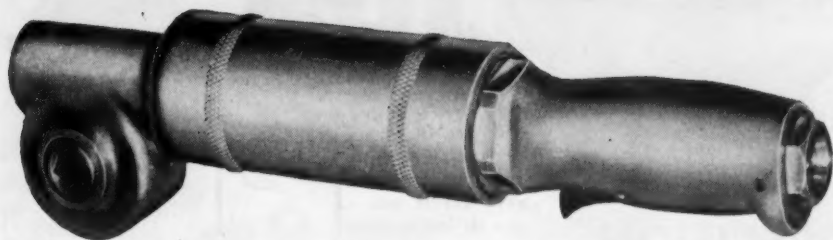
MAGNA-LOCK CORPORATION

Magnetic Chucks and Devices

BIG RAPIDS, MICHIGAN, U.S.A.

in portable wrenches

YOUR BEST BUY IS BUCKEYE



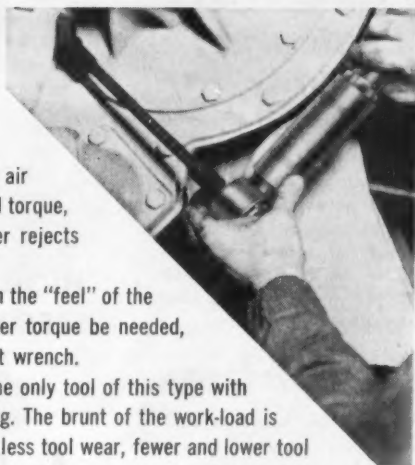
Nutsetting with a Buckeye portable air-powered wrench is always easier—on the product, the operator and the tool!

Easier on the product—by simply regulating the air pressure, a Buckeye wrench will deliver the desired torque, up to maximum motor capacity. That means fewer rejects due to work spoilage.

Easier on the operator—there's no need to rely on the "feel" of the work to know when the job is done. Should greater torque be needed, the tool can be used, with the air on, as a ratchet wrench.

Easier on the tool—the Buckeye air wrench is the only tool of this type with power provided through planetary and worm gearing. The brunt of the work-load is divided over a much greater gear area. That means less tool wear, fewer and lower tool maintenance costs.

You'll find complete details and specifications in our Air Tools Catalog—may we send you a copy? If you like, we'll arrange a trial-test of a Buckeye angle wrench in your own plant, without obligation.



Buckeye Tools
CORPORATION

DIVISION 17 • DAYTON 1, OHIO

producers of
the world's first
successful
rotary air tools



WHICH...

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The search is on in earnest for ways of making operations more **AUTOMATIC**. Throughout all industry the swing to automation is a swing to Precision FLEXOPRESS—in the race to keep ahead of competition.

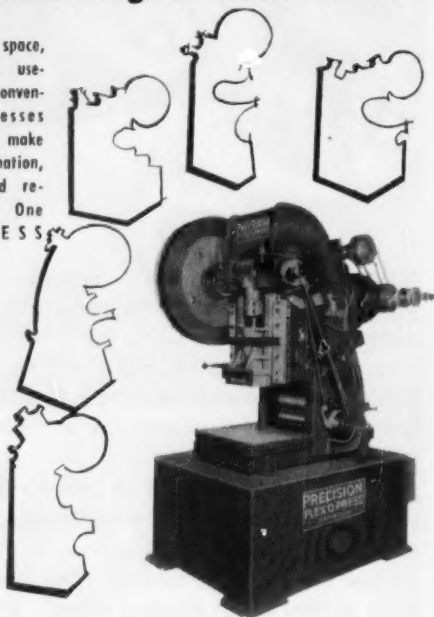
Efficiency is Cheaper

Fighting fire with fire . . . automatic feeding, tooling, and Precision Automatic Flexopress methods eliminate astronomical overhead dollars . . . separate men from boys . . . in the economic war on production costs.

Crowded floor space, hand operators, useless tools, conventional type presses move out to make room for imagination, ingenuity and resourcefulness. One FLEXOPRESS does it all.

15
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Tons

**HIGH
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As the pressure is put on for lower prices—the enterprising and ingenious will make an “investment for tomorrow” and meet the challenge overnight. It can be met . . . it has been met by PRECISION AUTOMATIC FLEXOPRESS.

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CINCINNATI 10, OHIO

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performance
and features
equal to
or surpassing
machines
costing
up to 58%
more!

MAKE YOUR OWN COMPARISON



Features and dimensions are easy to compare . . . and so is performance, backed up by user reports stating that Greaves 2H plain and universal milling machines outperform mills costing almost twice as much!

Before you buy any milling machine, send for your copy of the Greaves Comparison Chart. You'll find that the Greaves is full size, completely rugged, accurate and dependable . . . yet it sells for thousands of dollars less than comparable machines.

with a free chart
comparing these 22
specifications
on 8 leading mills!

- Price
- Working Surface
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- T-Slots—center distance
- Swivels
- Longitudinal Power Feed
- Cross Power Feed
- Vertical Power Feed
- Spindle Center Line to Top of Table—Max.
- Spindle Center Line to Top of Table—Min.
- Column to Brace
- Column to Inside Arbor Support
- Arbor to Underside of Overarm
- Taper Hole • Nose Diameter
- Hole Through Spindle
- Speeds • Speed Range
- Feeds • Feed Range
- Power • Weight

GREAVES MACHINE TOOL CO.
2700 Eastern Avenue, Cincinnati 2, Ohio
Please send me the COMPARISON CHART

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Firm _____

Address _____

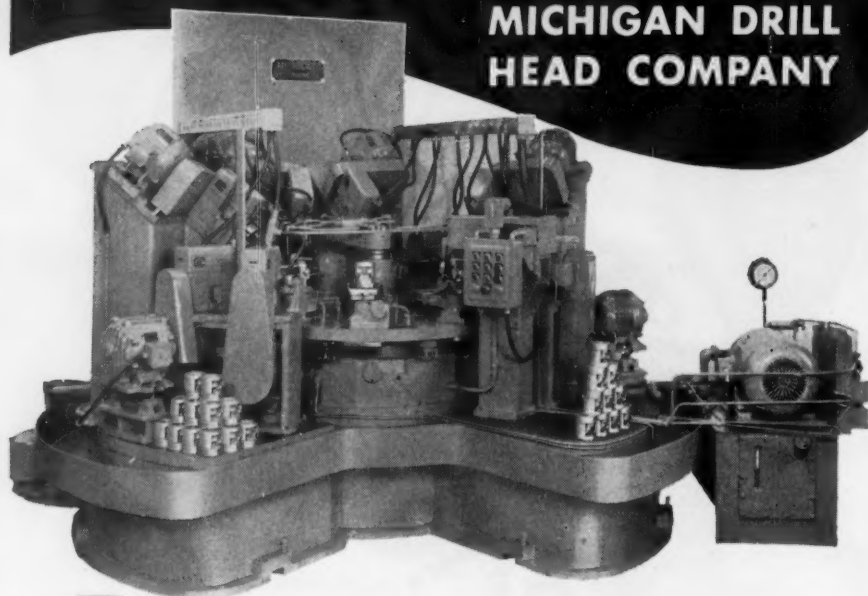
City _____ Zone _____ State _____

Write
for your
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of this
eye-opening
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chart

Special Drilling Machine

DESIGNED AND BUILT BY THE

**MICHIGAN DRILL
HEAD COMPANY**



PICTURED is a 12-way, 6-station automatic drilling machine which drills 8 smoke holes and 4 oil holes in an automotive piston. This machine features a turn-around fixture and automatic ejection of the part. As the table indexes, the fixtures are hydraulically positioned to present the proper surfaces to the drills. In station number six, the parts are hydraulically ejected down a chute. The machine uses a standard Michigan 30" Hydraulic Index Table for indexing. This machine will produce 500 pieces per hour.

WE SOLICIT YOUR INQUIRY AS TO ANY SPECIAL DRILLING,
MILLING OR BORING OPERATIONS YOU MAY NAME



MICHIGAN DRILL HEAD CO.

971 E. EIGHT-MILE ROAD

HAZEL PARK, MICH.



HOW SMALL PINES Hydraulic BENDERS SPEED OUTPUT of TV SERVETTE TRAYS

At Quaker Stretcher Co., Kenosha, Wis., four Pines Series 1400 Benders are producing high quality bends for TV servette tray legs at unusually low cost. Two smooth, 90° bends on a 2" CLR are formed in 5/8" x .018" wall, roller-coated, lock-seam tubing *without marring the black enamel finish.* The machines, costing under \$2000.00 each, are operated by women. High efficiency is maintained. *Net production per machine averages 432 bends per hour,* and the only scrap loss is a very few pieces while making setups. Pines Series 1400 Benders feature small capital investment, fast, easy operation, and uniform results. Hydraulic actuation assures dependable accuracy, low operating cost.

PINES ENGINEERING CO., INC.
Specialists in Tube Fabricating Machinery 643 WALNUT • AURORA, ILLINOIS

PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY



Closeup showing easy-operating manual toggles, simple tooling. Plug mandrel, Ampco bronze wiper die produce smooth, mar-free bends in pre-coated stock.

Free DATA SHEETS



Write for free copies of "Pines News" illustrating latest cost-cutting bending techniques. Or, call on Pines Engineers for assistance on any job.

NEWEST OF THE U. S.-BURKE SUPER-VALUE MACHINE TOOLS

THE ECONOMICAL ANSWER
TO ACCURATE, VERSATILE
VERTICAL and ANGULAR MILLING

"U. S." VERTICAL Milling Machine

Created by America's foremost producers of small milling machines, to fill the big need for a balanced-head vertical miller that provides greater capacity and flexibility than is normally associated with machines of its type.

The new U. S. Vertical ideally combines most advanced engineering, experience of practical machinists and modern design without sacrifice of basic characteristic "U. S." simplicity.

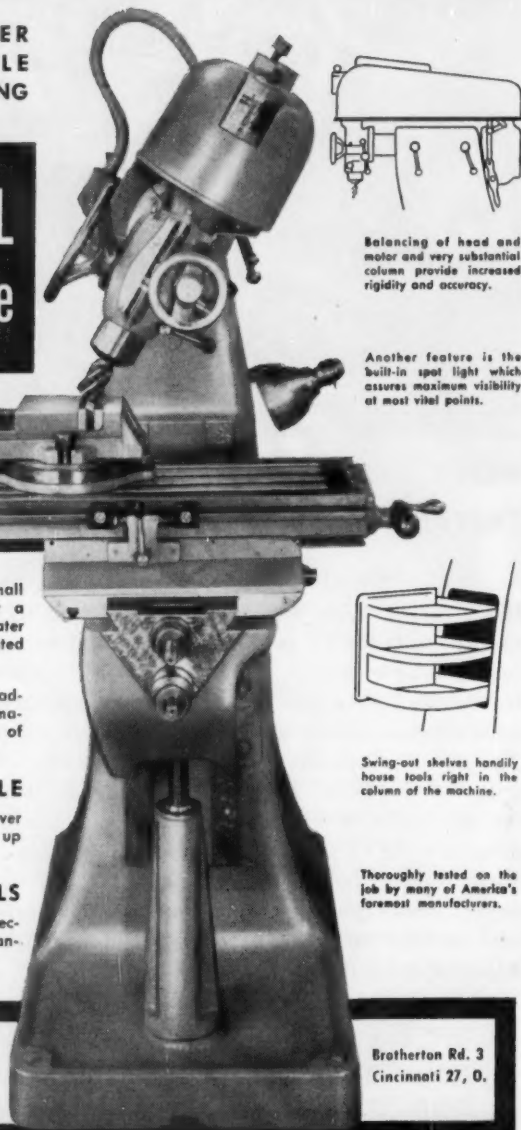
COSTS SURPRISINGLY LITTLE

Quickly pays for itself by simplifying or taking over vertical milling and boring jobs which often tie up far more costly standard machines.

SEND FOR COMPLETE DETAILS

Illustrated literature which describes complete specifications, capacities, exclusive features and advantages gladly furnished on request.

U. S. BURKE
MACHINE TOOL DIV.



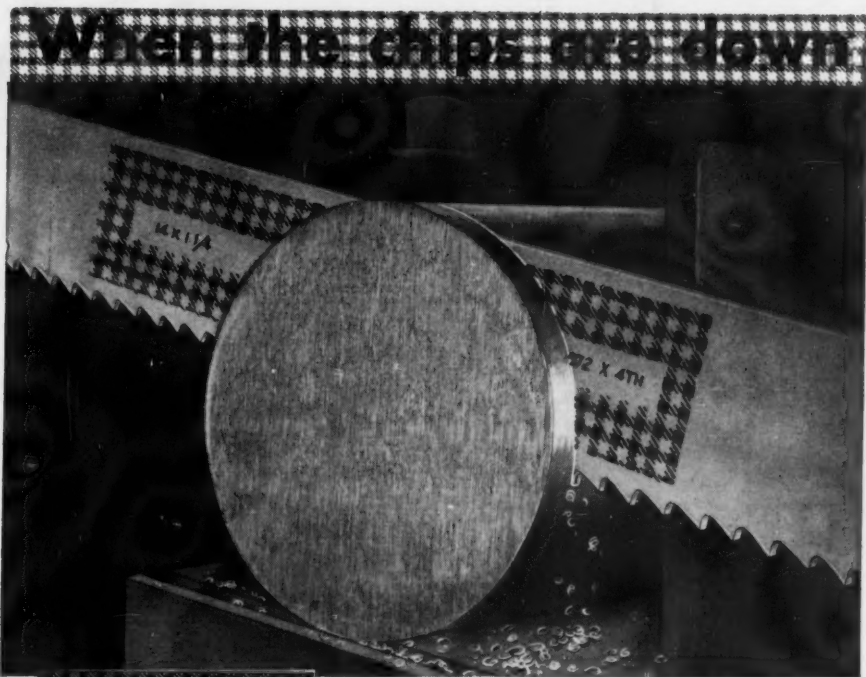
Balancing of head and motor and very substantial column provide increased rigidity and accuracy.

Another feature is the built-in spot light which assures maximum visibility at most vital points.

Swing-out shelves handily house tools right in the column of the machine.

Thoroughly tested on the job by many of America's foremost manufacturers.

Brotherton Rd. 3
Cincinnati 27, O.



LENOX

POWER HACK SAW BLADES are best by every test!

QUALITY . . . The very finest in both
steels and workmanship

SERVICE . . . Prompt Deliveries

TECHNICAL ASSISTANCE . . .
Whenever needed on unusual
or difficult cutting problems

These things we pledge to you. The final test is on
your own machines. Try Lenox for yourself . . . on
any job . . . against any other blade in the world.
Then you be the judge.

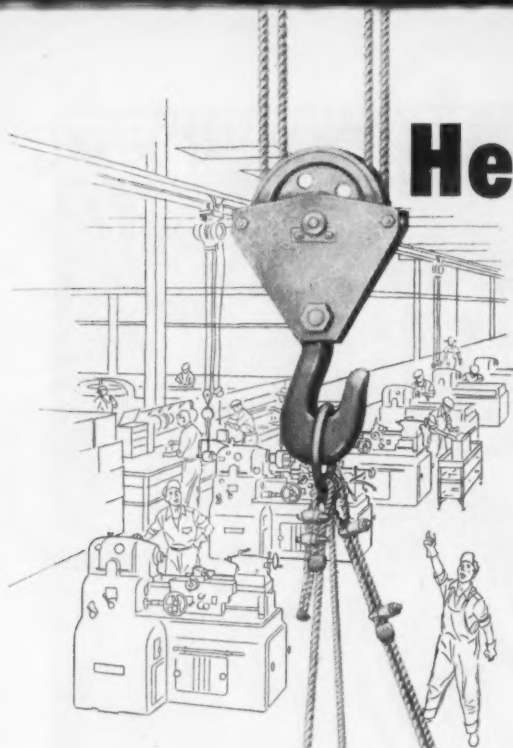


LENOX

**AMERICAN SAW
& MFG. COMPANY**
Springfield Massachusetts

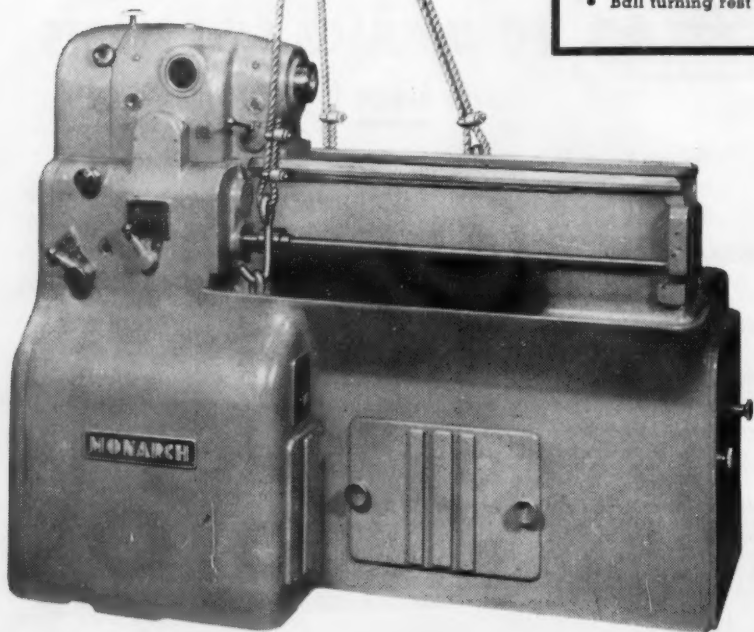
HACK SAWS BAND SAWS GROUND FLAT STOCK

Here's Where



TYPICAL EQUIPMENT

- "Air-Gage Tracer"
- Steady rest
- Follow rest
- Taper turning attachment
- Collet attachments
- Air equipment
- Bar feed attachment
- Collet chucks
- Jaw chucks
- Step chucks
- Stops
- Micro-gaging diameter dial
- Hexagon power feed bed turret
- Hand operated cut-off slide
- Variable feed control
- Ball turning rest



You Come In!

That's right—from here on you can just about write your own ticket! Think of the most exacting assignment for small lathes anywhere along your production lines. Then tell us! We'll deliver a high-speed, sensitive Monarch 10" Model EE—a lathe with an inbuilt productivity matched only by its versatility—and you'll get it with just the equipment and accessories to step up standards for that job.

Note the listing of typical equipment (left). An extraordinarily large choice is available, making it possible for the user to select the ideal combination for the utmost productivity on his class of work. The Model EE is equally adaptable for a

wide variety of between center and chucking operations. Note, too, that it can be supplied with the most accurate lathe duplicating method ever devised—the Monarch "Air-Gage Tracer."

These many variations in equipment have been developed solely in response to industry's demands that we make the basic Model EE design available for widening uses. Could anything we say speak better for its design and specifications? Some place—*many* places, perhaps—this outstanding Monarch lathe can improve your production at lower cost. Send the coupon today for full details.....
The Monarch Machine Tool Company, Sidney, Ohio.

FOR A GOOD TURN FASTER...TURN TO MONARCH



THE MONARCH MACHINE TOOL COMPANY, Sidney, Ohio.

Gentlemen: Please send me without obligation your Booklet No. 1003 covering the Monarch Precision Manufacturing Lathe—Model EE.

(It's that new one with 28 pages and a host of those sparkling Monarch illustrations.)

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COMPANY _____

TITLE _____

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COVEL No. 60 SURFACE GRINDER... ENTIRELY *NEW*

WITH *15"* CROSS FEED

Covel presents the No. 60 — latest in its 80-year line of precision machines . . . This ultra-modern surface grinder features a 14" x 24" work surface . . . 15" width of cross feed . . . 27" table travel . . . vertical work capacity of more than 18" . . . automatic, closed circuit hydraulic system . . . powered elevation and a long list of advantages best described in a new bulletin . . . yours for the asking.

Here's a Typical Use:

This new "60" is set up for wet grinding the surface of a trim die for die castings — but one of the wide range of tool room and production jobs for which this latest Covel grinder is suited.

80 YEARS of
continuous manu-
facturing experience
makes your COVEL
choice a sound one.

COVEL PRECISION GRINDERS
BENTON HARBOR, MICHIGAN

DRILL GRINDERS • UNIVERSAL CUTTER & TOOL GRINDERS • HYDRAULIC & HAND FEED SURFACE GRINDERS

WRITE
FOR
New
Bulletin
No.
M-64

with a **WIEDEMANN** you can
Reduce **INVENTORY and STORAGE SPACE !**
 produce parts as required.

All
38
 PIECES
 were pierced
 in
 1/8" mild steel
 IN
28
 MINUTES
 (including
 all
 set-up)

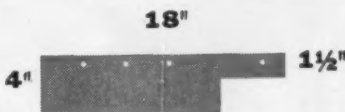
12 LIKE THIS



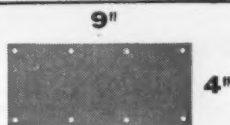
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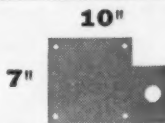
8 LIKE THIS



2 LIKE THIS



6 LIKE THIS



The company producing the above parts has eliminated inventory of these and many other items, has greatly reduced inventory of punches and dies—and they no longer need to stock templates.

The Wiedemann method enables them to ship parts directly to assembly rather than the stockroom.

Items are produced weekly or more often if necessary. Sizes of parts pierced on the Wiedemann range from 5 ft. by 10 ft. down to 2 in. squares.

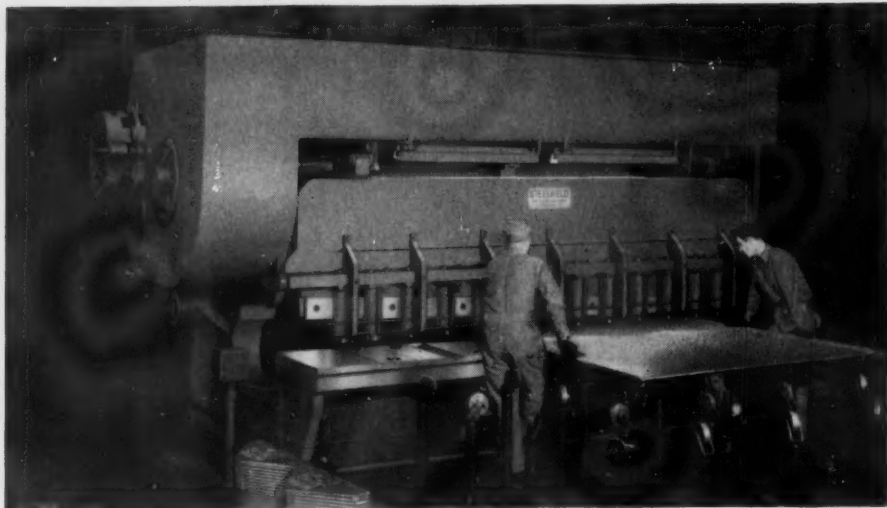
Inventory and storage reduction are just two of many cost-reducing features of Wiedemann Turret Punch Presses. We'll gladly make a time study on your own work.

WIEDEMANN MACHINE COMPANY

4219 WISSAHICKON AVENUE, PHILADELPHIA 32, PA.



Better Cuts Make Better Fits for Road Machinery Builder



This rugged machine is in service two shifts — 16 hours a day — five days a week shearing parts of various thick-

nesses and shapes for heavy earth-moving equipment. It is rated for mild steel 12' x 1'.

THE ease with which good, square, accurate cuts are obtained has made the Steelweld Shear of a road machinery manufacturer very popular with the operators and shop management.

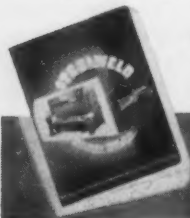
Experienced with various type shears, they know the importance of easy knife clearance adjustment. They know that the best cuts are obtained when the correct clearance is provided for each thickness of plate being cut. As they point out, improper knife clearance on any shear often results in a heavy plate being cut at an angle with respect to the thickness, or light gauge metal burring.

Adjusting knife clearance on Steelweld Shears

is such an easy, quickly-performed task that operators take care of it automatically. Turning a hand crank until a gauge pointer is on the proper metal-thickness figure is all that is necessary — a task done in a matter of seconds.

The big time saving made on knife changing as compared with most shears is another factor greatly appreciated. Easily done in two hours on a Steelweld, this job frequently requires all day on other machines.

Steelweld's unusual pivoted-blade operating principle makes possible outstanding cost-cutting advantages. For the complete story, send for the catalog below.



GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

6440 East 282 Street, Wickliffe, Ohio

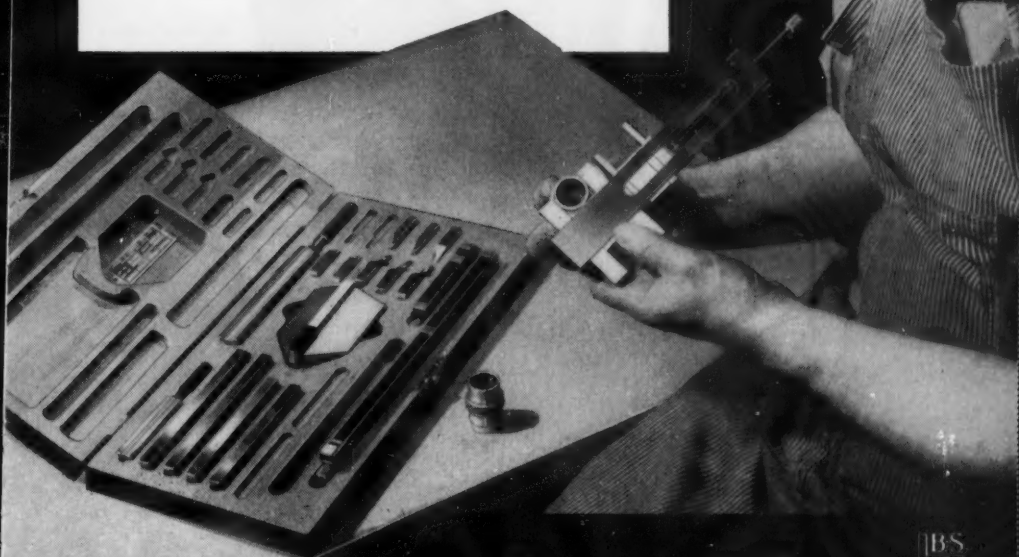
STEELWELD PIVOTED BLADE SHEARS


How Jo-Block Accessories Save Special-Gage Costs

Johansson Gage Blocks and Accessories may be quickly assembled into actual working gages that perform literally hundreds of high-accuracy measurements. Used as "Go"—"Not Go" gages, trammels, height gages, etc., they keep gage construction costs at a minimum . . . provide economical gaging set-ups for even the shortest runs. And they make precision standards practical "on the job" . . . at every stage of manufacture.

Brown & Sharpe Jo-Blocks are available singly or in sets—for use as laboratory or working standards. The many Accessories extend their use to almost limitless applications. Write for complete Catalog. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

BUY THROUGH YOUR LOCAL DISTRIBUTOR




Brown & Sharpe

another example—

knurled...

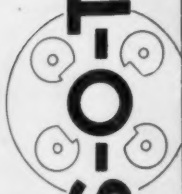


78% faster



WITH

VERS-O-TOOL





THREAD



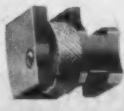
END FORM



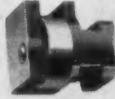
HOLLOW
MILL



COMBINATION
THREAD and MILL



KNURL



BURNISH

WITH BLADE CUTTERS



THREAD



HOLLOW MILL

When Whitin Machine Works, Whitinsville, Mass., applied their 1 $\frac{5}{8}$ " standard Vers-o-tool to one-pass knurling this textile machine part (7" long, B-1113 steel), they stepped up former production from 72 to 128 pieces per hour.

They get a higher quality too, because the 4-cutter Vers-o-tool head opens instantly at the end of the cut and pulls back fast without contact to damage the sharp knurl. Thousands of different jobs* are run every day with standard Vers-o-tools equipped with multiple chasers or cutters such as those shown at the left.

Most of these simple, rugged heads are used for threading, equipped with the long lived Ground Thread Circular Chasers—most economical for long runs—or with the lower-cost Adjustable Blade Ground Thread Chasers for smaller lots. All guarantee Class 3 or pressure-tight quality threads—and smoother.

Conversion from Circular Chaser threading to any other type multiple cutters is simple: you change only the cutters and blocks—all types of which are interchangeable, head size for head size, for revolving or non-revolving heads. Vers-o-tool capacities range from .056" to 6 $\frac{1}{2}$ ".

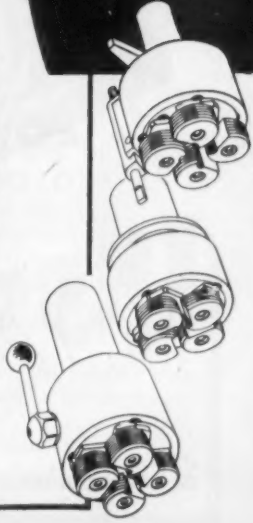
Ask us to show you how standard VERS-O-TOOLS can step up your OUTPUT, guarantee ACCURACY, reduce your TOOL INVESTMENT and your OPERATING COST. Ask for catalog DT-52.

24-hour deliveries on standard stockable NC and NF chasers and blocks. Also National Taper Pipe and Dry Seal.

The NATIONAL ACME COMPANY

170 EAST 131ST STREET • CLEVELAND 8, OHIO

ACME-GRIDLEY BAR
and CHUCKING AUTOMATICS
1-4-6 and 8 Spindle • Hydraulic
Thread Rolling Machines • Automatic
Threading Dies and Taps • Limit,
Motor Starter and Control
Station Switches • Solenoids •
Contract Manufacturing.



Here's a NEW design feature in Vertical Mills!



VERTICALLY ADJUSTED HEAD GIVES GREATER RIGIDITY AND ACCURACY

Here are the facts . . .

Unlike knee-type mills, the head of the IMPCo Model 1-B Vertical Milling Machine is vertically adjusted by a counter-balanced ram. The table and controls do NOT move vertically. The exclusive ram design has greater rigidity. Its larger scraped bearing surface area gives more accuracy for both production and tool room milling.

Massive Design for Versatility and Precision

The IMPCo Model 1-B is heavy for a No. 1 Mill. It weighs approximately 3,100 lbs. Spindle quill diameter is 3½". Uses standard 1 HP motor.

Get all the facts.
Write for Bulletin MM-102.



IMPCO

INDUSTRIAL METAL PRODUCTS CORPORATION

Builders of IMPCo Straighteners, the American HEB Pilot Lathe, and Special Machinery

3412. W. ST. JOSEPH STREET

LANSING, MICHIGAN



Shaft is inserted at an angle by Walter B. Best, operator. This is allowed by the flexibility of the collet and greatly reduces tailstock resetting adjustment.



Collet gets impact tightening. Hand-wheel hammer lugs deliver impact blow on sleeve inside handwheel. Force is several times greater than hand tightening.

COLLET PERFORMS GRIPPING FEAT

Rubber-Flex Collet jaws close down on work with parallel bearing that defies slippage

International Equipment Company in Brighton, Massachusetts, has high praise for the unique Jacobs Rubber-Flex Collet, heart of the Jacobs Spindle Nose Lathe Collet Chuck.

The collet delivers 2 to 4 times the gripping power of split steel collet chucks, provides absolutely parallel grip over entire bearing surface. Its multiple, long steel jaws are locked together with oil resistant synthetic rubber and offer 50-75% greater length of bearing than possible with split steel collets. Each collet has a full $\frac{1}{8}$ " range so that 11 collets have the gripping range of 88 split steel collets, chucking any bar between $\frac{1}{16}$ " and $1\frac{3}{8}$ ". The chuck permits maxi-

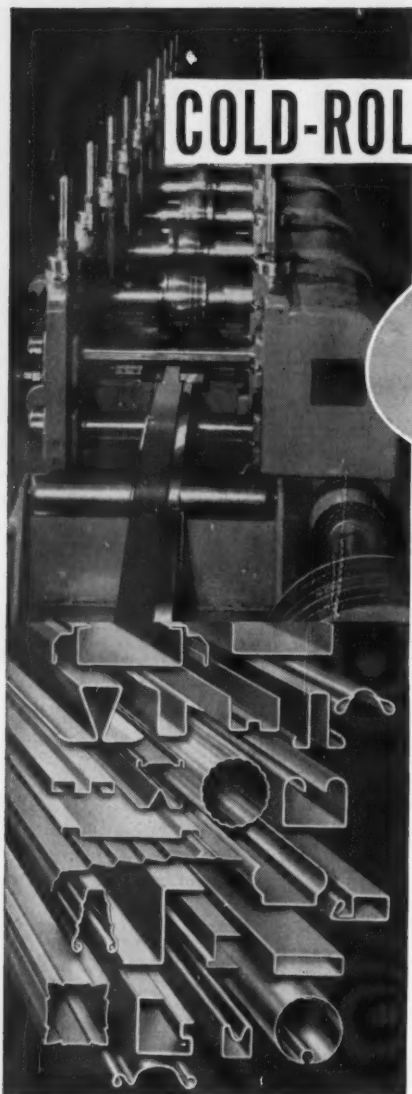
mum speeds and feeds on modern tool lathes. It is the world's finest collet chuck. The Jacobs Manufacturing Company, West Hartford 10, Connecticut.

**IF IT'S A
JACOBS
IT HOLDS**

***Jacobs and your
local distributor***

are ready to deliver the chucks you need and the service you deserve.

***... first in chucks
... first in service***



COLD-ROLL FORMING...

a **CHALLENGE**
and a
PROMISE

● Cold Roll Forming holds a perpetual challenge to your skill and ingenuity in devising new ways to step up production and reduce cost. Infinite possibilities are suggested by thousands of existing applications in the high-production metal working industries.

New applications are constantly being discovered. Total production of Yoder cold roll forming machines now runs into billions of feet annually.

A Yoder roll forming machine can be arranged for doing other operations, such as notching, embossing, perforating, curving, coiling, welding, etc., at little or no extra labor cost. Yoder engineers are at your service in designing such multi-purpose production lines.

The Yoder Book on Cold Roll Forming discusses its varied functions and advantages, with scores of photos illustrating end uses of roll formed products. Ask for it.

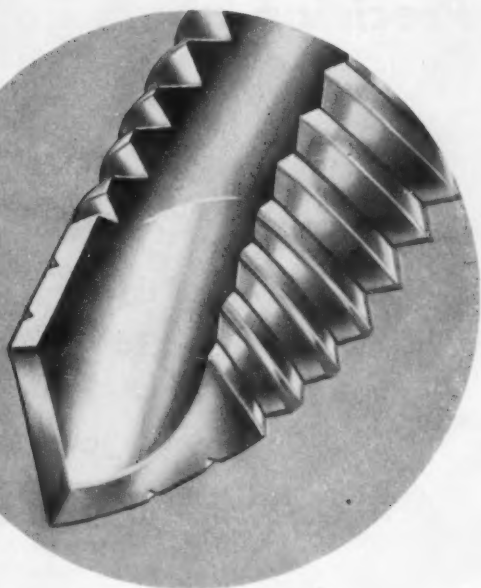
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5532 Walworth Avenue • Cleveland 2, Ohio

Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS—cold forming and welding





No matter what the job
demands, you just can't
beat the performance
of a Butterfield tap.

BUTTERFIELD

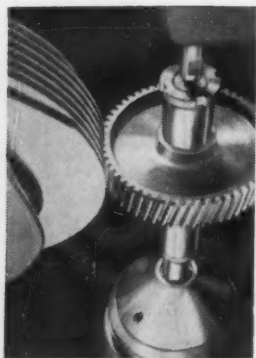
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DERBY LINE, VERMONT, U.S.A.
TAPS • DIES • DRILLS • REAMERS • COUNTERBORES • SCREW PLATES

FOR BETTER SERVICE
CALL YOUR
BUTTERFIELD
DISTRIBUTOR

Precision gears go flying



The real-life counterpart of this imaginatively drawn gearbox has as many as 30 separate gears — most are precision ground by LYCOMING on REISHAUER ZA GEAR GRINDERS



Single-thread grinding worm and spindle of the Reishauer ZA.

Auxiliary "nerves" of the mighty J-40 and J-47 jet engines, these precision gears transmit power to run fuel and oil pumps, generators, and other vital accessories. Lycoming, maker of this intricate gearbox, depends on Reishauer ZA gear grinders for precise, rapid production of gears.

Lycoming likes the way Reishauer consistently produces gears to extremely close tolerances at high production speeds. Furthermore, operators on the production line benefit from the simplicity and cleanliness of the machines' operation.

Lycoming is not alone in its respect for Reishauer grinders—these machines are widely used to grind spur and helical gears in the automotive and aircraft industries. Other users include machine tool builders, gear-jobbers, and instrument manufacturers.

In short, Reishauer ZA grinders are excellent machines. If you want proof, we'll be happy to supply it. Get in touch with us soon, won't you?

COSA CORPORATION

405 Lexington Ave., New York 17

Your source for all Precision Machine Tools—
from Small Bench Lathes to Large Boring Mills

IN DETROIT AREA contact DETROIT-COSA CORPORATION, 16923 James Couzens Highway, Detroit 35, Mich.

NEW!

**THE
MODERN
TYPE M
STUD SETTER***



***A Better Stud Setter
for
Better Stud Setting!***

**Details on Request*

MODERN TOOL WORKS

DIVISION

CONSOLIDATED MACHINE TOOL CORPORATION

WHOLLY OWNED SUBSIDIARY OF FARREL-BIRMINGHAM COMPANY, INCORPORATED

ROCHESTER, NEW YORK

FROM



1. 4-PURPOSE PRECISION PANTOGRAPH

The "*Panto-Miller*"

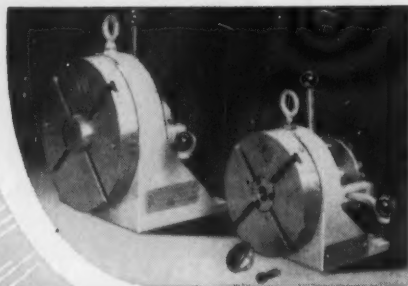
- Engraves
- Profiles
- Die Cuts
- Mills

A sturdy, production tool for 2-dimensional cutting in steel, cast iron, non-ferrous metals and plastics.

Pantograph reductions from 1:1 to 1:40. Spindle speeds infinitely variable from 1,200 to 11,500 RPM without belt changing.

Extreme accuracy and freedom of motion. Write for "*Panto-Miller*" details.

JOHNSON & BASSETT, INC. *Production Tool Div.*
BOX 1251, WORCESTER, MASSACHUSETTS, U. S. A.



2. RAPID, ACCURATE JIG POSITIONING

This indexing trunnion, with station selector, accurately holds and locates either jig or work. SIMPLIFIES JIGS. REDUCES SET-UP TIME.

Ask for "TRUNNION" information

How do you buy Socket Screws?

Do you specify some one make by *habit*, because you think *all* such fasteners are alike — all simply “screws with hex sockets?” If you do, and have never used P-K Socket Screws, break the habit *once* and give them a trial. You’ll find that the hex shaped socket is about the *only* way other makes and P-K are “alike.”

Look Beyond the Hex

It pays to look beyond the socket when you buy Socket Screws. Compare every detail of product and service, and you’ll find P-K Socket Screws take top honors in every test for quality, performance, economy.

Why miss out on any of the advantages you can get with P-K Socket Screws? Try them. For samples, catalog, or any needed information, see your P-K Distributor, or write: Parker-Kalon Division, General American Transportation Corporation, 200 Varick St., New York 14.



FOR ADVANCED DESIGN
that speeds assemblies — makes them simpler, stronger — and saves errors.



FOR TOP QUALITY and tolerance gaged to your most exacting specifications — and guaranteed.



FOR ASSEMBLY STRENGTH okayed in a million punishing tests by thousands of satisfied users.



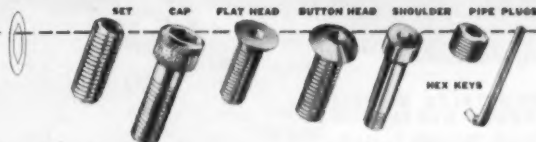
FOR PLANNING AIDS and buying data patterned to your special needs, plus advice on assembly.



FOR SUPPLY SERVICE set up for fast action and lower purchasing expense — by local Distributors.

**GET ALL
THESE ESSENTIALS OF
COST-WISE ASSEMBLY**

PARKER-KALON SOCKET SCREWS



SAY P-K

In Stock for immediate delivery — see your nearby P-K Distributor

Blue Chip Winnings



with
Brightboy
RUBBER-CUSHIONED
ABRASIVES

Each of Brightboy's widely adaptable textures consists of a special-formula "cushioning" rubber binder and matched abrasive. The rubber-cushioned action gives you a refreshing, revolutionary concept of finishing. Applications are far beyond the range of other methods.

ASK YOUR DEALER NOW FOR BRIGHTBOY LITERATURE. Advise us if he cannot supply you. Write us on any problem where finishing is involved.

MAKE HIGHER PROFITS from time savings of as much as 50% in your finishing! **MAKE FASTER, BIGGER SALES** because the finishing is finer, better! Beat today's keener competition which stresses product eye-appeal that brings in business!

Because of its unique, rubber-cushioned action Brightboy simultaneously **BURRS, FINISHES, CLEANS, POLISHES** in one time-saving operation. And today its wide versatility and adaptability are multiplied many-fold because

THE COMPLETE BRIGHTBOY LINE IS NOW COMPOUNDED

WITH EITHER ALUMINUM OXIDE OR SILICON CARBIDE GRAIN

AND—Brightboy is now available in a wide variety of grain sizes ranging from extra coarse to extra fine, in soft, firm and tough rubber binders!



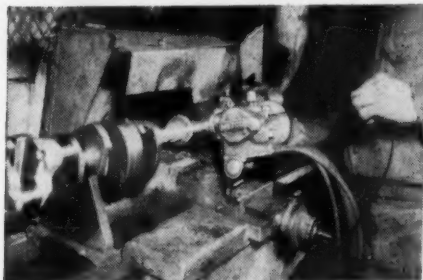
*Wheels, Sticks,
Rods, Blocks,
for machine
and manual
operations*



**BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.**
95 No. 13th St. • Newark 7, N. J.

America's Pioneer Manufacturer of Rubber-Bonded Abrasives

when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.



Free Bulletin

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.

METALLIZING ENGINEERING CO., INC.

38-14 30th St. Long Island City 1, N. Y.

In Great Britain: Metallizing Equipment Company, Ltd.—Chobham near Woking, England

...and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours. Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. **You haven't just salvaged a part—you've improved it.**

The trade name, SPRABOND WIRE, is the property of Metallizing Engineering Co., Inc.

Don B. Watson, Metallizing Eng., Co., Inc.
38-14 30th Street, Long Island City 1, N. Y.

- ☐ Please send me Bulletin 57-C.
☐ Please have Metco Field Engineer call.

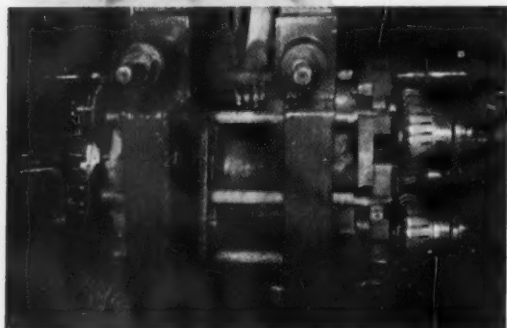
Name

Company

Street

City Zone State

THERE IS NOTHING HARDER THAN A DIAMOND but **W**ESSONMETAL IS TOUGHER!



ACTUAL JOB Large Automobile Plant

Machine.....Davis Thompson Milling Machine
Part.....Rear axle shaft
Operation.....Rough and finish mill spline end
Material.....S.A.E. 1038—Brinell Hardness
179-229
Tools.....Wesson 6" and 8" dia. Milling
Cutters—fine pitch—inserted blade
Speed.....8"—387 S.F.M.
6"—290 S.F.M.
Feed......14" per minute
Production...150 pcs. per hour
1500-1700 pcs. per grind
Grade of Carbide....Wessonmetal WM

SAVINGS OF OVER \$14,225 PER YEAR ON ONE MACHINE WITH ONE SET OF WESSON TOOLS

OLD METHOD

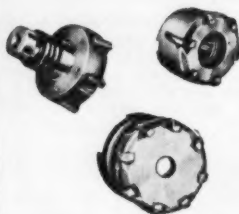
Cost 1 set Inserted Blades.....\$48.00
Pieces per Grind.....275
Grinding Hours per year.....10,300
5 Machines Running 3 Shifts
Machine Repair per year.....\$25,000
Tool Cost per Piece.....\$.00545*

**NEW WESSON ENGINEERED
METHOD**

Cost 1 set Inserted Blades.....\$54.60
Pieces per Grind.....1600
Grinding Hours per year.....2500
3 Machines Running 2 Shifts
Machine Repair per year.....\$1200
Tool Cost per Piece.....\$.00213*

*(Machine repair and grinding costs not included)

HOW IS YOUR PRODUCTION SCORE CARD!



Write today for folder
on Wesson's
educational, full color,
sound movie —
"This Carbide Age."

Call Your
WESSON SERVICE ENGINEER—



WESSON METAL CORPORATION

LEXINGTON, KENTUCKY

Affiliated with WESSON COMPANY, Detroit, Mich.

Get on the Right "TRACK"...

with your
SMALL PARTS!

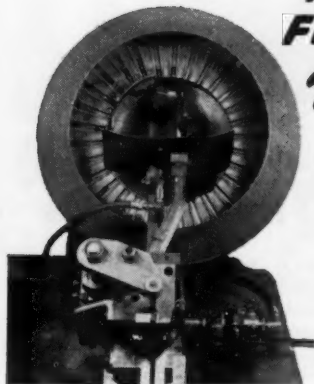
**DISCARD SLOW
MANUAL
FEEDING!**

Use

DPS

**SELECTIVE
FEEDING DEVICES**

● Note the improvement in Lower Costs, Speedy Production, Quality Control and Increased Profits . . . Now, this DP contribution to the metal-working industry is emphasized in an expanded line of selective feeding devices and engineering service . . . Tell us your requirements; we have the unit and the know-how to meet your needs.



DPS

BARREL-FEEDER

● Here is an interesting case showing separate screws and lock washers that were loaded into a single feeder and ejected loosely assembled at the rate of 60 to 70 a minute . . . An amazing speed increase over slow, manual operation. In this instance, as in thousands of other applications, the unit was designed with the idea of maximum feeding of a wide variety of parts at a fraction of the cost of manual feeding.

DPS

**BOWL-
FEEDER**

● An electric, vibrating unit that advances the parts on a circular spiral, aligning and correctly locating them to issue directly into the work area in proper time cycle. Provides fully automatic feeding of light, fragile parts that normally could not withstand tumbling.

Let us diagnose your symptoms and prescribe the proper remedy.
Write for details.



DETROIT POWER SCREWDRIVER CO.

2807 W. FORT ST.

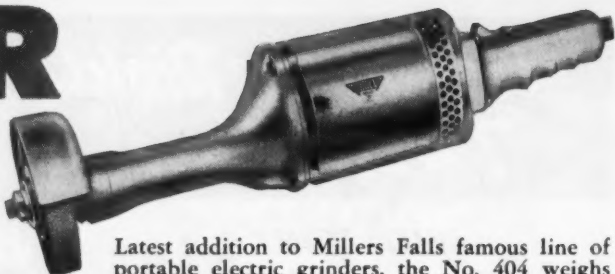
DETROIT 16, MICHIGAN

June, 1954

MODERN MACHINE SHOP 93

FOR

New, light-weight,
heavy-duty No. 404



MILLERS FALLS GRINDERS

Latest addition to Millers Falls famous line of portable electric grinders, the No. 404 weighs only 9¼ lbs., yet has a 5.5 amp. rating. It uses 4" diameter wheels up to 1" wide and is designed for continuous heavy-duty service such as snagging castings, grinding welds, grinding off rivets, etc. Other models up to 6" with speed ranges from 3700 r.p.m. to 5500 r.p.m.

FASTER

High-speed,
high-powered
No. 270



MILLERS FALLS POLISHERS

This advanced-design polisher has the extra power (a full 5 amps.) and greater spindle speed (1900 r.p.m.) needed for best results with the latest type cleaners and polishers. Standard equipment includes deep, carpet-pile wool pad, the most effective polishing head ever developed.

FINISHING

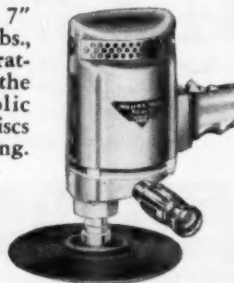
MILLERS FALLS SANDERS



The Mark of Superiority

Light, high-power No. 870

A beautifully engineered 7" unit. Weighs only 7½ lbs., but with a full 5.5 amp. rating. Perfect for driving the new laminated phenolic grinding wheels and discs as well as for fast sanding. Other models up to 9".



FREE literature on request. Or, let us arrange a demonstration. Millers Falls Company, Dept. MM-3, Greenfield, Mass.

for more *Accurate* cuts...
greater *Rigidity* in

BORING TOOLS

BORING HEADS
BORING BARS



Use **CRITERION** BORING EQUIPMENT

BORING PROBLEMS? CLOSE TOLERANCE?

Try Criterion Boring Tools. Built with the same care and quality as the time-tested Criterion Boring Head.

THIS COMBINATION WILL PRODUCE RESULTS

Boring heads from 1½ to 7 inch diameter. Boring tools, carbide or high speed steel, ⅜ to 1¼ inches diameter. Bore holes from ⅛ to 20 inch diameter.

Accuracy for the closest tolerance • Rigidity for the heavy cuts • Heat-treated parts for long wear

LARGE OFFSET SAVES TIME AND TOOL CHANGES

These tools will cut your boring costs.

See the complete line of **CRITERION TOOL PRODUCTS** at your local dealers or write for free catalog.

**CRITERION
MACHINE WORKS**

9312 SANTA MONICA BLVD • BEVERLY HILLS, CALIF.

For STATISTICAL QUALITY CONTROL

COMTORPLUG

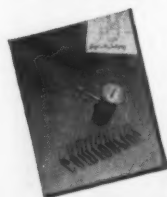
PRECISION
INTERNAL

COMPARATOR

Here in a compact, self-contained unit you have the high precision that has found a prominent place in the jet engine program, the automatic transmission program and other fast moving set-ups. Used at machine or bench, Comtorplug has self-aligning features assuring accuracy. Ideal for Statistical Quality Control programs. Comtor Co., 64 Farwell St., Waltham 54, Mass.

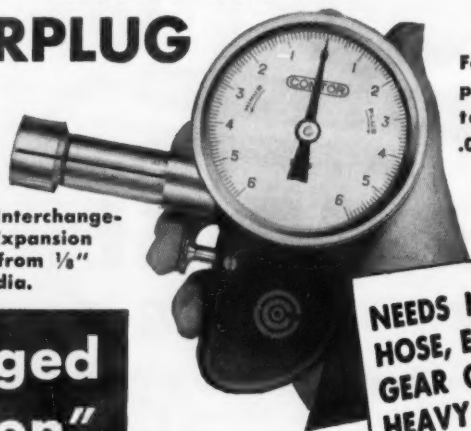
Write for "Bulletin 48"

COMTORPLUG



With Interchangeable Expansion Plugs from $\frac{1}{8}$ " to 8" dia.

"Packaged Precision"



For gaging high-precision holes to fractions of .0001"

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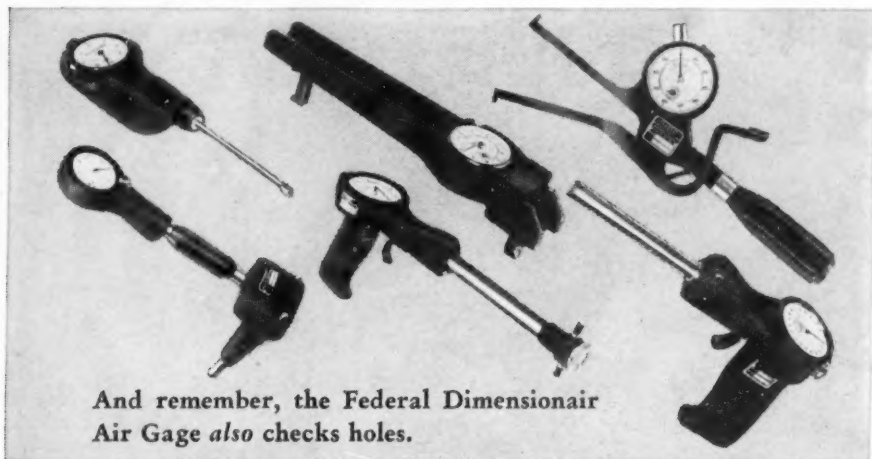


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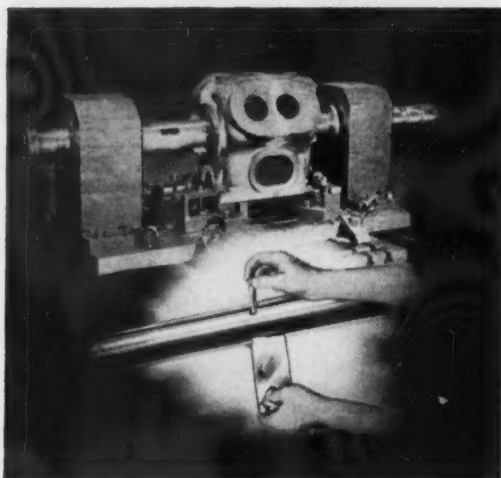
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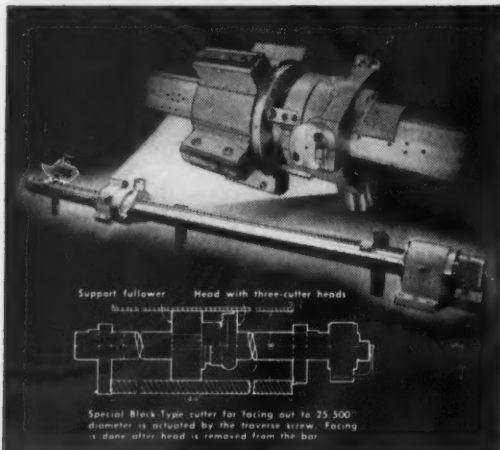
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Davis Block-Type cutters simplify ordinary float boring and reaming. Here, you see Davis Block-Type cutter, mounted in a Davis line bar, being used to bore the crank bores in an air conditioning housing.

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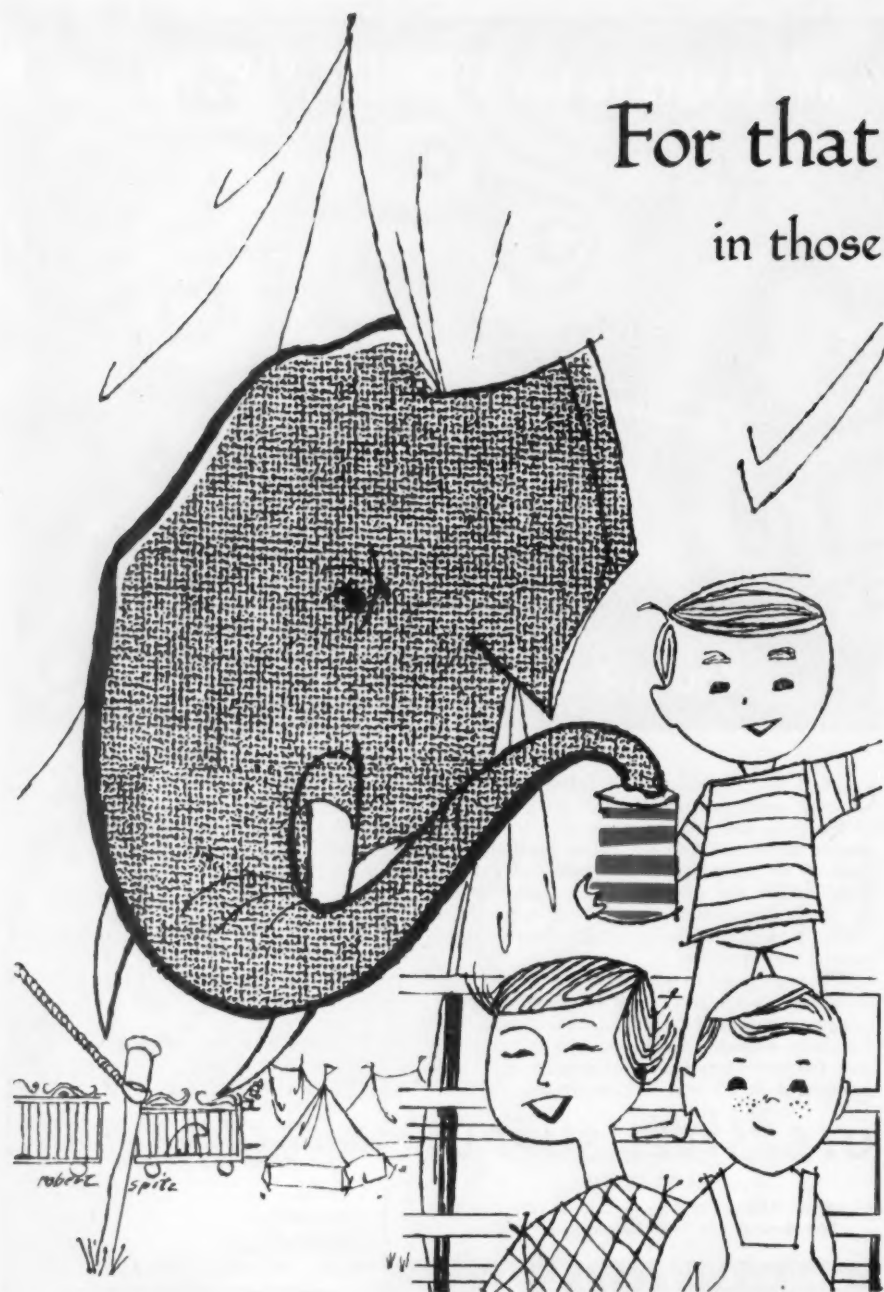
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520 CUTS

IN AN 8-HOUR DAY...

Angles, Bars, Channels and Beams

Report from

Joseph T. Ryerson & Son, Inc., Chicago; branch warehouses in principal cities.

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Friction Saws in use

16 — among all Ryerson plants.

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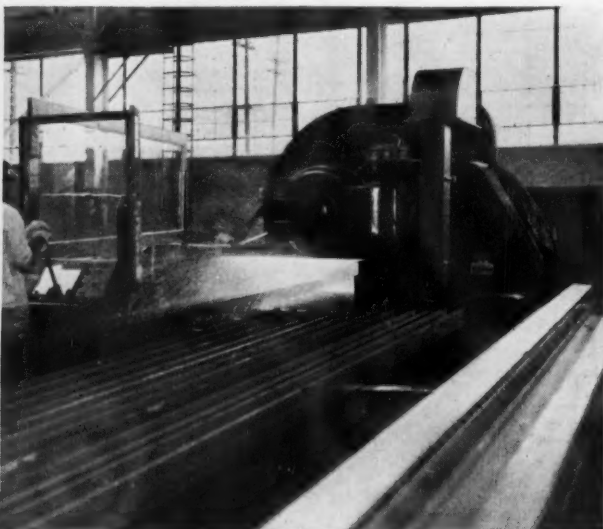
Cutting angles, bars, channels, beams.

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Average 520 cuts of miscellaneous items in an 8-hour day, ranging from light channel sections to 30" x 124 lb. beams.

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Has reduced the amount of burr, reducing time required to chip or clean the cut.



Kling HIGH SPEED FRICTION SAWS

increase cutting production **FOR "THE BEST OF COMPANIES!"***

Greater cutting speed with all types of steel... versatile ability to cut many different kinds of structural shapes... cleaner cutting... and lower investment in initial equipment—these are some of the advantages that attract industrial plants and steel warehouses like Joseph T. Ryerson & Son, Inc.—to the use of Kling Friction Saws.

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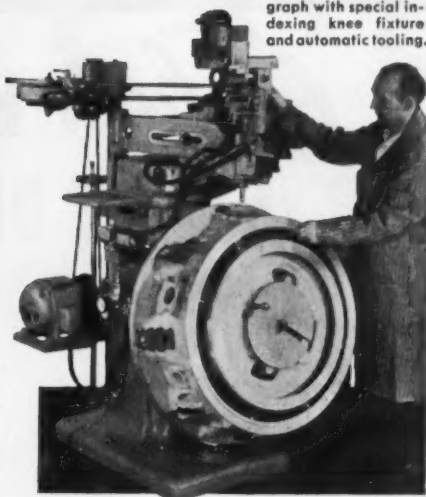


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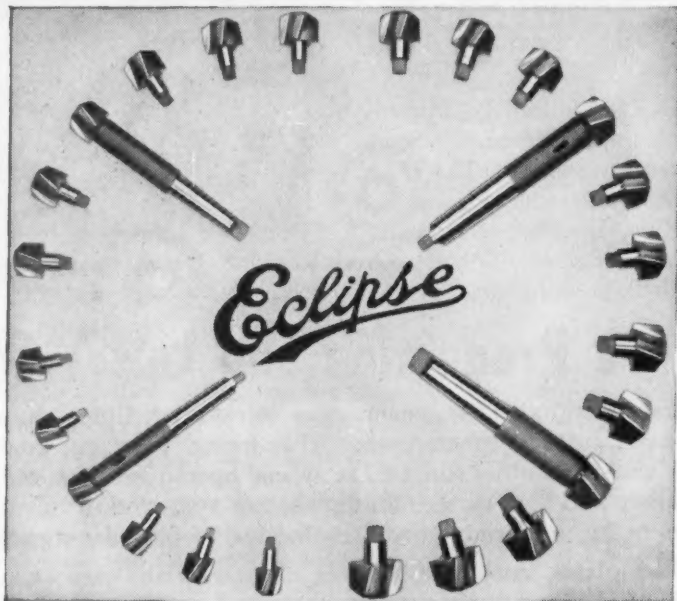
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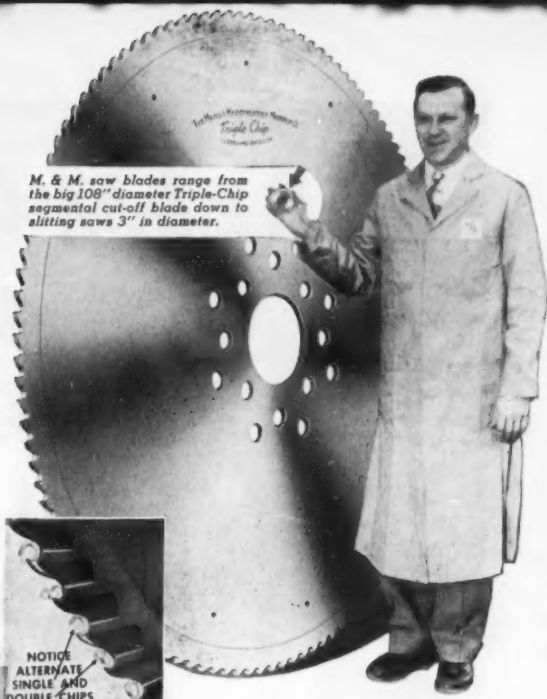
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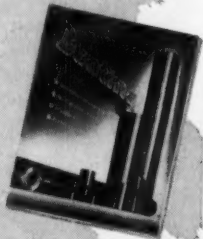
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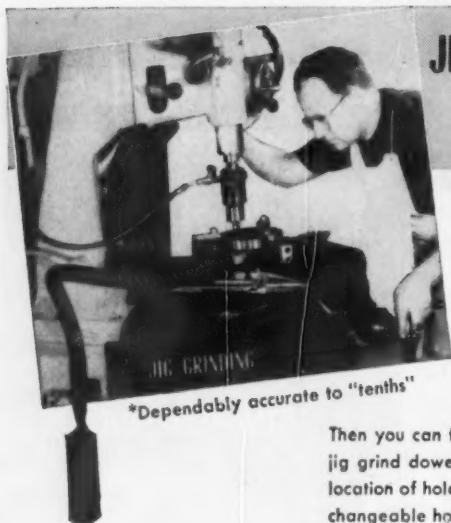
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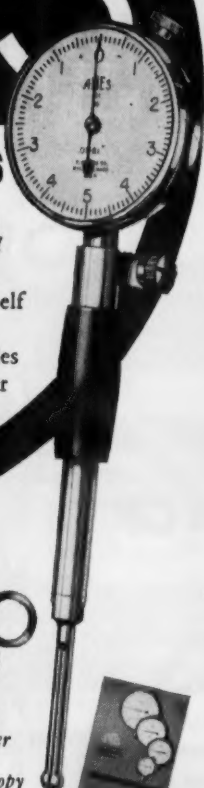
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Skilled and unskilled employees can use this superbly designed two-point contact gauge to make quick, accurate, *impersonal* inspections of small holes for size, taper and roundness.

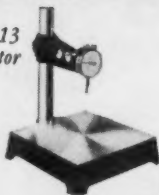
The spherical contact point automatically centers itself and indicates the true diameter at the point measured.

The Ames Small Hole Gauge No. 36 checks holes with $3/16''$ to $1''$ diameter, up to $2''$ deep. Longer lengths and special contacts to check irregular recesses, splines, available.



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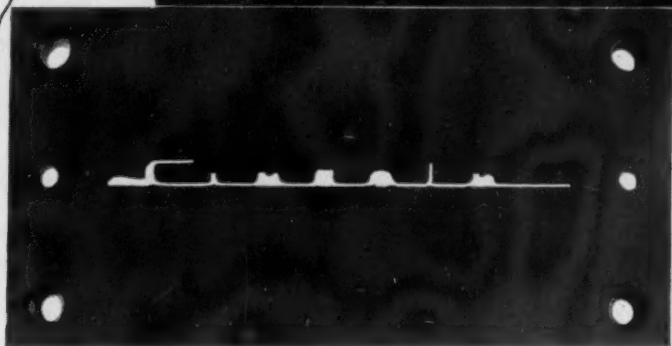
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over the editor's desk

Next Month

NEXT month we will bring you the second annual "More Production Through Modernization" issue, an issue which will feature thought-provoking articles on the subject of modernization prepared by men who speak with authority based on their years of experience in the metalworking field. An entire section will be devoted to descriptions of recently developed tools in use—tools which have enabled the users to obtain increases in production, savings in time, manpower, and so on.

While one of the most important parts of a production executive's job is to keep himself fully informed on new tooling developments, especially those which are applicable to his own operations, it is equally important that he keep abreast of the newest production techniques to be found throughout industry. To this end, we know that a great deal of benefit will be derived from reading the feature articles which have been assembled for the July issue.

NMTBA Meeting

SPEAKING at the Spring Meeting of the National Machine Tool Builders' Association last month in Chicago, Mr. Herbert L. Tigges, president of the association, expressed considerably more optimism toward future business in the machine tool field than we have heard for quite some time. Referring to the industry's release from Government controls and regulations and a return to the normal function of supplying our Country's needs, on a competitive basis, Mr. Tigges pointed to a combination of certain fac-

tors which are present in the economy today that the machine tool industry has not been faced with before.

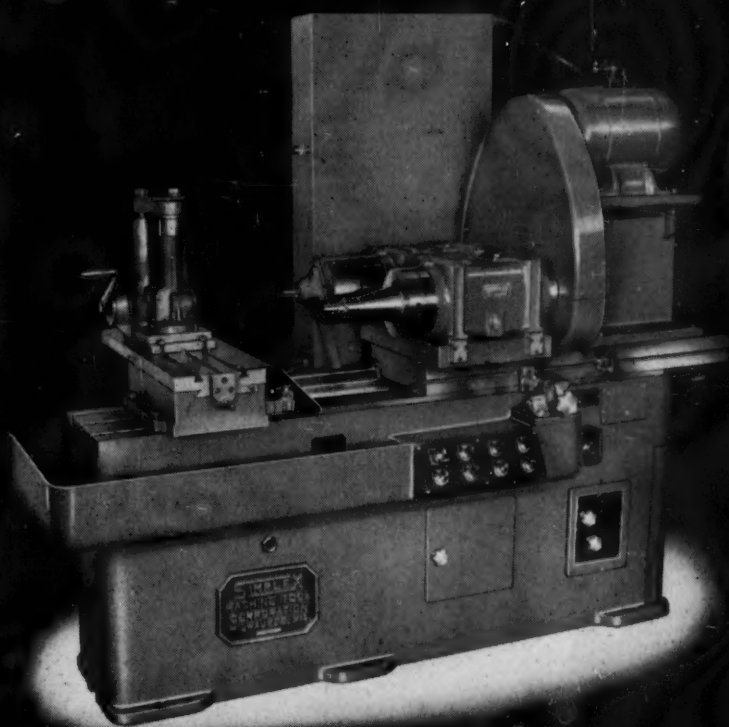
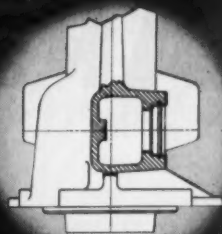
This combination of factors includes:

1. A continuing high level of industrial production;
2. The greatest accumulated obsolescence, in metal cutting and metal forming equipment, in the Nation's history;
3. A competitive situation among the users of machine tools that is bound to make them extremely cost-conscious;
4. National defense requirements that are regarded as continuous, instead of emergency business; and
4. A more understanding attitude, on the part of Government, than the machine tool and metalworking industry as a whole has had for many years.

The able NMTBA president singled out selling as the area in which greater improvement may be made in the machine tool industry. In this connection he mentioned participation in the Sales Conference at Cornell University, the need for salesmen to stress the many supplemental benefits to be derived from new machine tools, the need for salesmen to become familiar with tax laws and procedures with respect to depreciation allowances, the gains to be derived from making full use of advertising and public relation facilities, and so on.

It was obvious from the keynote address delivered by Mr. Tigges as well as from the many excellent reports given at this meeting that the members of the National Machine Tool Builders' Association are making a determined effort to achieve constant or level production and thus eliminate or at least minimize the periods of feast or famine that have plagued the industry in the past.

Simplex



Machine Cycle
 Rapid Advance
 Rough Bore with Front Head
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 Finish Bore, Face and Groove
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SIMPLEX 2U Single End Hydraulic Feed Precision Boring Machine complete with two $\frac{3}{4}$ SIMPLEX self-contained automatically lubricated precision boring heads, automatic feed out mechanism. This machine has the electrical and hydraulic equipment made to conform to J.I.C. standards. A hydraulically actuated cross slide with a manually clamped type work holding fixture is mounted on the work table and supports a Transmission Rear Housing for the rough and finish bore, face, chamfer and grooving operation.

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ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

5228 West Armstrong Ave., Chicago 30, Illinois



MODERN Machine Shop

Vol. 27, No. 1
JUNE, 1954

features
in this issue

How to Cut Worms on a Hobbing Machine

By Peter R. Noling

The author explains in detail a procedure for cutting worms by the hobbing and milling process, depending on the number of threads on the worm. Page 116.

Selection and Heat Treatment of Tool and Die Steels, Part II

By Howard E. Boyer

In this installment, the author discusses the transformation characteristics of tool steels. Page 124.

Racks for Cylindrical Components

By Fred Rogers

Illustrated and discussed in this article are several designs of racks used with housing-enclosed spindles, solid type rods and other cylindrically shaped members. Page 132.

Douglas Improves Auxiliary Foundry Practice

By Gilbert C. Close

This article points out how, in the new El Segundo plant of Douglas Aircraft, the latest in soft metal auxiliary foundry techniques and equipment were engineered together into a comprehensive layout. Page 146.

Discussion Questions for Safety Training

By Alfred M. Cooper

In this presentation the author explains some of the things that should be brought out in the discussion of typical safety discussion questions and also provides the administrator of such a program with suggestions that will help him in preparing additional questions. Page 159.

Piercing Punch Calculation

By Federico Strasser

Methods are presented for determining whether the physical properties and dimensions of a punch are correct for the job at hand. Page 178.

New Process of Resistance Welding in Liquid Conserves Scrap Titanium

The discussion covers a new process of resistance spot welding in solution developed by The Glenn L. Martin Company which makes possible the utilization of virtually all scrap sheet titanium generated by the plant. Page 190.

How National Supply "Guards" Against Grinding Hazards

By Gale Whitacre

Outlined in this article are safety procedures followed in the Tool Grinding Section of the Torrance plant of National Supply which have prevented disabling injuries in this particular section for a period of more than ten years. Page 200.

Machining Stainless Steel—Case History No. 16

By G. J. Stevens

The author explains how difficulties were overcome in machining a slightly concaved surface on the head of a threaded stainless steel stud. Page 206.



How to Cut Worms on a

By PETER R. NOLING*

In which the author explains in detail a procedure for cutting worms by the hobbing and milling process, depending on the number of threads on the worm.

TO increase the usefulness of your hobbing machines, it might be well to consider using them to cut worms. Although hobbing machines are not designed specifically as thread cutting machines, they can be used to good advantage in this type of work. The number of threads, pitch and size of worms which can be hobbled or milled are limited only by the capacity of your hobbing machines. However, in all cases a special type 90-degree hob swivel will have to be used.

Worms can be cut on a hobbing machine by either hobbing or milling, depending on the number of threads on the worm. Single and double thread worms are usually milled, and worms with three or

more threads are hobbled. The reason for this is that the high speed of the standard index worm when hobbing one or two threads is generally in excess of the recommended safe speeds for hobbing machines. However, if the hobbing machine is equipped with a special index worm and wheel, it may be possible to hob small diameter double-thread worms with special hobs. In fact, special machines can be designed for maximum production of double-thread worms.

Hobbing

The hobbing process is ideally suited to cutting worms. Wherever possible, this method of producing worms with three or more threads is recommended. In most cases, the finish on the worm will be almost as smooth as a ground finish if the

*Machine Tool Engineer, Barber-Colman Co., Rockford, Ill.

Hobbing Machine



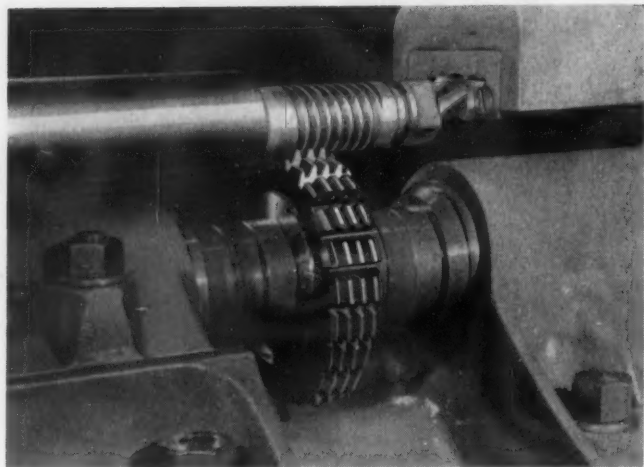
diameter of the hob, which is restricted by the capacity of the machine, is large enough in relation to the diameter of the worm. Due to the continuous indexing of hobbing, spacing of the worm threads can be held to very close limits. Thread profiles can be accurately controlled to close limits by the use of a suitably designed hob.

Hobbed worms produced by straight-sided hob teeth have an involute form in the transverse plane. Although the tooth form on the worm gear hob should be essentially a duplicate of the tooth form on the worm, a hob having straight-sided teeth will normally produce satisfactory results. If the worm is milled, ground or chased, special forms on the worm gear hob teeth are often required to provide suffi-

cient bearing. Consequently, hobbing is always recommended wherever it can be satisfactorily applied.

Since a fine finish is usually a requirement for worms, only single-thread hobs are recommended. Straight-sided worm hobs are made to the same tolerances as involute gear hobs. The worm hob is similar to a gear hob except that it is tapered for a portion of its length to prevent excessive strain on the entering teeth. When the lead angle is small, the hob should be the same hand as the worm.

The setup of the machine for hobbing worms is the same as for hobbing helical gears. The speed of the work spindle depends upon the number of threads on the worm and the lead angle. The feed for hobbing worms is usually very small. Al-



Two-thread worm is hobbled on a hobbing machine with a double-thread index worm. With a hob speed of 50 r.p.m., the speed of the index worm is within safe limits. The 2¼-in. threaded portion is hobbled in 19 minutes, of 0.002 in. per revolution and a horizontal feed of 0.003 in. This fine feed produces a finish of 25-50 microinches on the worm profile. The worm is 12.166 D.P., and the pitch diameter is 1 in. Diameter over pins is held within 0.001 inch.

though it is impossible to give exact figures for all applications, it is usually in the vicinity of 0.005 in. per revolution of the work. This is a good starting point which can be altered if the desired results are not obtained. Also, remember that the angle used in figuring the feed gears is the helix angle of the worm, not the lead angle.

If the worm threads extend the full length of the shaft, the work is set to full depth and the hob is fed horizontally across the work. When the worm is less than the full length of the blank, the work is set at full depth and the hob is fed horizontally across the work, but the worm must be cut to full depth for its required length before being taken out of the cut. Do not disengage the feed while the hob and work are rotating.

If the worm does not extend to either end of the shaft, the work is fed vertically to full depth and then horizontally for the required length. The horizontal feed must be engaged

before feeding the work vertically, and the feed cannot be disengaged until the machine is stopped or the work is raised out of the cut. For production runs, a cam vertical feed unit can be designed to feed the work automatically to depth. If only a few pieces are to be cut, the work can be fed by hand.

Milling

Milling worms on a hobbing machine is basically the same as it is on a milling machine or a thread milling machine. Hobbing machines are normally used only for milling relatively small numbers of worms. We do not usually recommend the hobbing machine for high production runs.

The cutters used for milling worms are thread milling cutters with the teeth set in an annular ring or rings. Although most cutters have teeth with straight sides, special forms can be developed for specific applications. If you use a cutter with a single row of teeth for a single-thread worm or a duplex cutter for

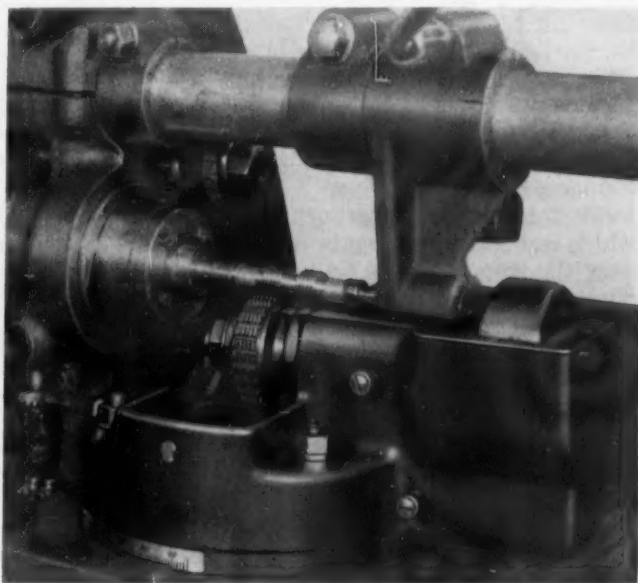
a two-thread worm, the work must make as many revolutions as there are convolutions of the thread on the worm. These cutters must be set at the lead angle of the worm. With a multiple thread milling cutter which is wide enough to cover the entire length of the worm, cutting can be completed in one and a fraction revolutions of the worm. The fraction depends on the amount the work rotates while the cutter is being fed to full depth plus a small amount for cleaning up at the end of the cut. If an exceptionally smooth finish is required, the work can be rotated two revolutions. The multiple cutter is set with its axis parallel to the axis of the work. This cutter may be made with a slight modification on the form to compensate for the lead angle on the worm.

Double-thread worms can be cut with a duplex cutter which eliminates indexing from one thread to the next as required with a single cutter. Since neither tooth on a duplex cutter is centered with the work, the cutter tooth form must be modified to produce the correct

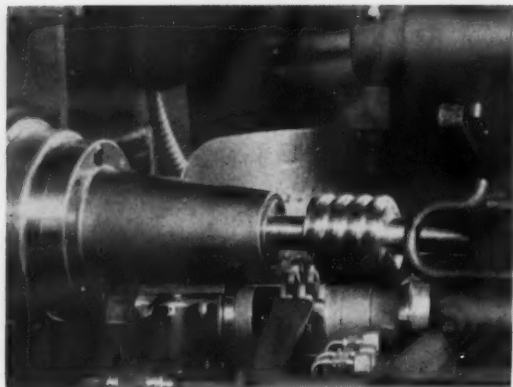
form on the worm. It is difficult to center a duplex cutter so that an accurate form will be produced on the worm. Consequently, a duplex cutter is recommended only if the worm does not require maximum accuracy of form. For high production of double-thread worms, hobbing on a machine designed specifically for the job is recommended.

Set the cutter r.p.m. to give the surface cutting speed desired. In general, surface cutting speed is inversely proportional to the hardness of the blank and the depth of the cut. A good starting point for selecting cutter speeds is a table of milling cutter speeds in a milling machine operator's handbook. The speed change gears for the speed selected are found in the tables in the back of the operator's handbook.

The r.p.m. of the work, which determines the quality of finish, is



Special hob swivel is required for either hobbing or milling worms in order to prevent interference that would occur between a standard swivel and parts of the machine.



Duplex cutters are used for cutting double-thread worms on a hobbing machine when hobbing is not applicable.

controlled by the index change gears. To get the index change gear ratio, it is necessary to solve the following equation to find the number of teeth for which to index.

$$NT = \frac{\pi \times \text{P.D.}}{N \times C/T \times \cos A}$$

where NT = Number of teeth to index for

P.D. = Pitch diameter of work

N = Number of teeth on the cutter

C/T = Chip-per-tooth

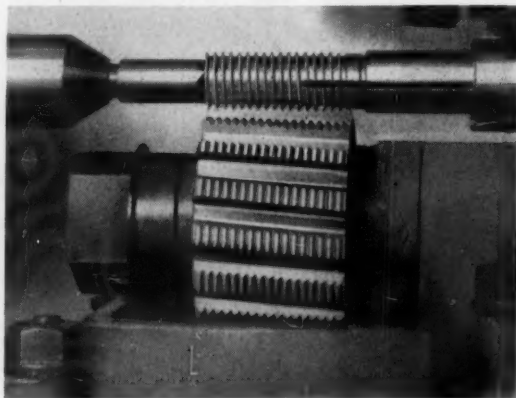
A = Lead angle on worm

Since this is only an approximation, select the closest whole number which will allow the use of suitable change gears. The chip-per-tooth is an arbitrary figure which can be altered to produce the smoothness of finish desired. Here again, no exact figures can be given due to the many variables which affect the finish. Nor-

mally, a chip-per-tooth of 0.001 in. will produce a satisfactory finish. For a better finish, use 0.0005 in. When the number of teeth for which to index has been figured, look in the tables for spur gears in the back of the operator's handbook for the required change gears. If the number of teeth for which to index is so high it is beyond the scope of the table, use the basic formula to find the correct index gears. This formula, which can be found in the back of the operator's handbook, is

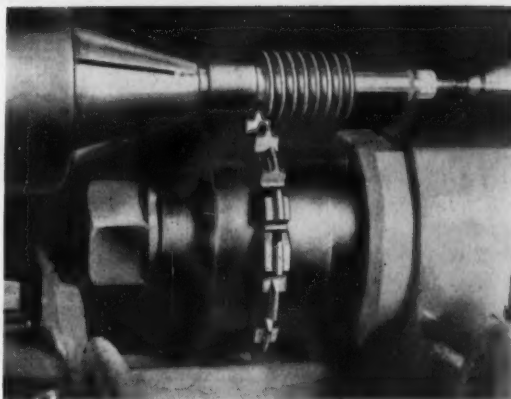
$$\frac{\text{Machine constant}}{\text{number of teeth}} = \frac{\text{Driver}}{\text{Driven}}$$

If the number of teeth is so large that it is impossible to fit the index change gears into the machine, the chip-per-tooth must be increased to reduce the number of teeth for which to index. If the increase is too great,



A multiple thread milling cutter cut this single-thread worm on a hobbing machine using a vertical feed of 0.020 in. per revolution and a horizontal feed of 0.100 in. per revolution.

A single worm milling cutter is used on a hobbing machine to cut this 24 D.P. single-thread worm. At a feed of 0.1309 in. per revolution and a speed of 133 r.p.m., the cutter produces a finish on the sides of the worm teeth within the tolerance of 63 r.m.s.



the finish may be unsatisfactory, making it necessary to find another means of producing the worm.

The feed per revolution of the work will be equal to the lead of the worm helix. To get the feed change gears, turn to the feed tables in the back of the operator's handbook and find the gears opposite the feed. If the feed for the job isn't listed, the gears can be determined by the following formula.

$$\frac{\text{Feed}}{\text{Feed Constant}} = \frac{\text{Driver}}{\text{Driven}}$$

As an example, suppose the feed we needed for a job on the hobbing machine were 0.145 inch. As the change gears for this feed are not listed, we find them by the formula

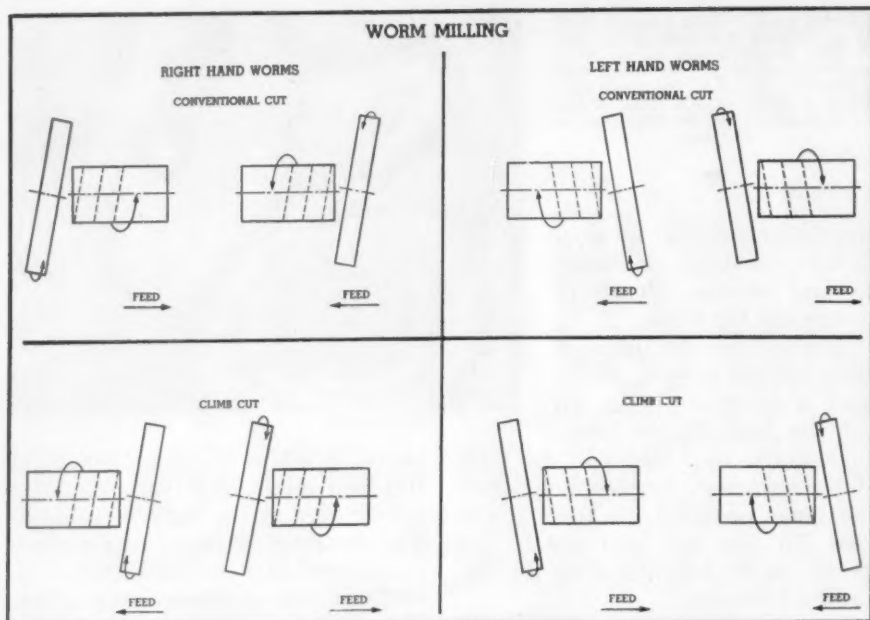
$$\frac{\text{Feed}}{.075} = \frac{\text{Driver}}{\text{Driven}}$$

$$\frac{.145}{.075} = \frac{5 \times 29}{3 \times 25} = \frac{60}{36} \times \frac{58}{50}$$

The basic setup for milling worms on a hobbing machine is identical to the setup on a milling machine. As mentioned previously, a 90-degree hob swivel will have to be used because the hob arbor must be swiveled nearly parallel to the work axis, resulting in interference of the standard swivel with other parts of the machine. Remember that when using the 90-degree swivel, the graduations are arranged so that the

swivel is set at the complement of the lead angle of the thread helix rather than at the lead angle itself. The machine can be set up for climb or conventional cutting in either direction. The accompanying drawings show the correct rotation of the work and cutter for all possible arrangements. Whenever possible, the thrust should be against the work spindle rather than the tail center, particularly on deep forms. After mounting a single cutter on the hob arbor for the proper direction of rotation, set the hob swivel to read 0 degrees, and center the cutter beneath the axis of the work. With a duplex cutter, the tooth space is centered beneath the work axis. The swivel is then set to the lead angle of the worm thread. Multiple cutters do not require centering since they are set parallel to the work axis.

To feed the cutter when the worm extends the full length of the shaft, the work is set to full depth and the longitudinal feed engaged to cut the entire length. When the worm is less than the full length of the blank, be sure that the worm is cut full depth



These drawings show the correct rotation of the work and cutter for all possible arrangements in the climb and conventional milling of worms on a hobbing machine.

for its required length before being drawn up. If the worm is cut in the center of the shaft, engage the longitudinal feed first, lower the work to full depth and hold while the worm is cut the required length. When the worm has been cut the full length, leave the longitudinal feed engaged as the work is raised. For special production runs, cams arranged on the power vertical feed and the hori-

zontal feed can be set to carry out the complete cycle automatically.

Double-thread worms are cut with practically the same setup as single-thread worms. The feed of the duplex cutter will still be equal to the lead, but the lead will now be twice the pitch of the worm. Using a duplex cutter is recommended only if the work to be done does not require maximum accuracy.

Threading Film

Jones & Lamson Machine Company has announced the completion of a new threading film. In direct response to the reception given the thread tool section of its popular Production Seminars, J&L has put the die head story on 16-mm colored sound film.

The entire film is expected to run under 30 minutes. Beginning with the basic definition of a screw thread, the movie goes on to portray both tangent and radial threading. Animation, demonstrations and enlarged models inject interest. The film will be available on a loan basis in the near fut-

ure, and requests for booking should be made to Jones & Lamson Machine Co., 521 Clinton St., Dept. 710, Springfield, Vermont.

Elements of Mechanism. By Venton Levy Doughtie and Walter H. James. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 494 pages. Illustrated. Cloth binding, board covers. Price, \$6.00.

This book carries forward the valuable approach of the well-known Schwamb, Merrill, James and Doughtie work upon which it is based, bringing the reader abreast of new developments in the field by using up-to-date terminology and examples. Like its predecessor volumes, the book is designed to fulfill two major purposes:

(1) to acquaint the reader with the application of fundamental principles of physics and simple mathematics in the field of mechanical movement and (2) to develop in the reader, through the study of the more fundamental machine elements and analyses of their motions combined in certain ways, the habits of thought and the powers of visualization necessary in the analysis of any mechanical device, no matter how complicated. Each subject is developed with as little reference as possible to other material; thus, the book can be used to obtain a working knowledge of the entire subject or as a reference on slightly more advanced topics, such as centro methods for finding velocities, Coriolis's law, Klein's construction and miscellaneous mechanisms.

40,000-lb. Steam Drop Hammer

THE accompanying illustration shows a 40,000-lb. steam drop hammer recently completed by the Chambersburg Engineering Co., Chambersburg, Pa., for the Air Force. Two other hammers of this type will be completed later this year. The machine features a newly engineered frame and a special ram 70 in. front to back, which brings the total falling weight to 40,000 lb. The sow block or cap is 80 in. front to back. The cylinder bore is 38 in. and the stroke 65 in. The maximum die space is 22 in. and the space between guides 48 in. The hammer stands 26 ft. 4 in. above the floor line and weighs approximately 1,200,000 lb. The assembled anvil weighs approximately 875,000 lb. and consists of an upper section which is a steel forging weighing approximately 300,000 lb. and mounted on two sub-bases.

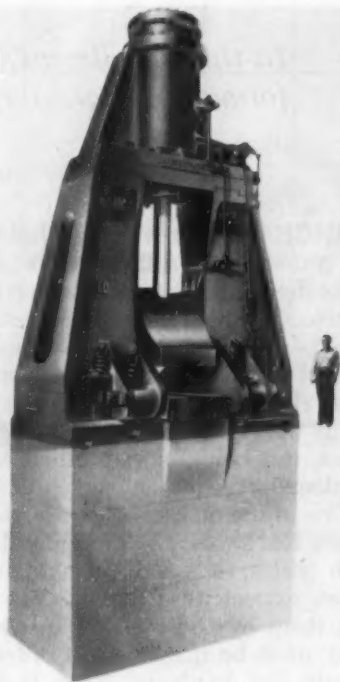


TABLE-I

CLASS	C	MN	SI	NI	CR	MO	W	V	CO
1	.17	.40	.25	3.20	1.15	.15			
2	.35	.30			5.00	1.15	1.10		
3	1.01	.27	.23						
4	.90	1.25	.30		.50		.50		
5	1.05	.65	.30		5.25	1.10		.25	
6	1.50	.32	.30		11.80	.80		1.00	
7	.25	.29	.26		4.03		15.10	.52	
8	.85	.25	.30		4.15	5.10	6.30	2.05	
9	.87	.26	.25		4.00	4.60	5.60	1.80	9.00

The complexity of tool steel classifications can be simplified to some extent by dividing them into groups. This table shows one method which divides them into nine groups. Most tooling applications can be covered by compositions similar to those shown.

Selection and Heat Treatment of Tool and Die Steels, Part II

In this installment, the author discusses the transformation characteristics of tool steels.

By HOWARD E. BOYER

SINCE it is a proven fact that the properties of a finished tool are dependent to a great extent upon the structures which have been established, the next important fundamental about which the tool engineers should have some understanding is the transformation characteristics, this being closely allied with hardenability.

One of the older methods of classifying tool steels is by grouping them into water, oil and air-hardening types respectively; that is, classifying them by the medium in which they must be quenched in order to obtain full hardness. Even though

this method is grossly inadequate today, it still serves a useful purpose. It is apparent that relatively few tool engineers are aware of the properties possessed by the steels which place them in one of these classes. The medium in which tool steels must be quenched from elevated temperatures in order to provide full martensite structures is dependent upon the transformation characteristics of the steel which are mainly influenced by composition, although grain size also plays an important part. Figures 5, 6 and 7 are curves which show the transformation characteristics of typical water-

hardening, oil hardening and air-hardening steels respectively. These curves are known as TTT curves (Time, Temperature and Transformation). The basic fundamentals which govern the behavior of steels in thermal treatment are simple and can be easily explained by the aid of these TTT curves. As tool steels exist annealed at room temperature they are generally composed of two constituents: (1) small particles of carbide, irrespective of whether they are straight carbon carbides or alloy carbides, and (2) ferrite, which is the metallurgical term for the matrix, which is mainly composed of the element iron, although it may be rather high alloyed with several other elements. When this mixture is heated to 1400 deg. F. or above, the crystalline structure known as ferrite changes into another crystalline structure known as austenite. While the carbide particles are

essentially insoluble in the ferrite crystal, they are quite soluble in austenite, so at this temperature a condition of solid solution takes place and a great portion of the carbide particles is dissolved. The austenite crystal in most steels is stable only at elevated temperatures, so that when the temperature is decreased the carbide particles tend to precipitate from solid solution. It is because of this fact that steels can be altered in their mechanical properties by means of heat treatment.

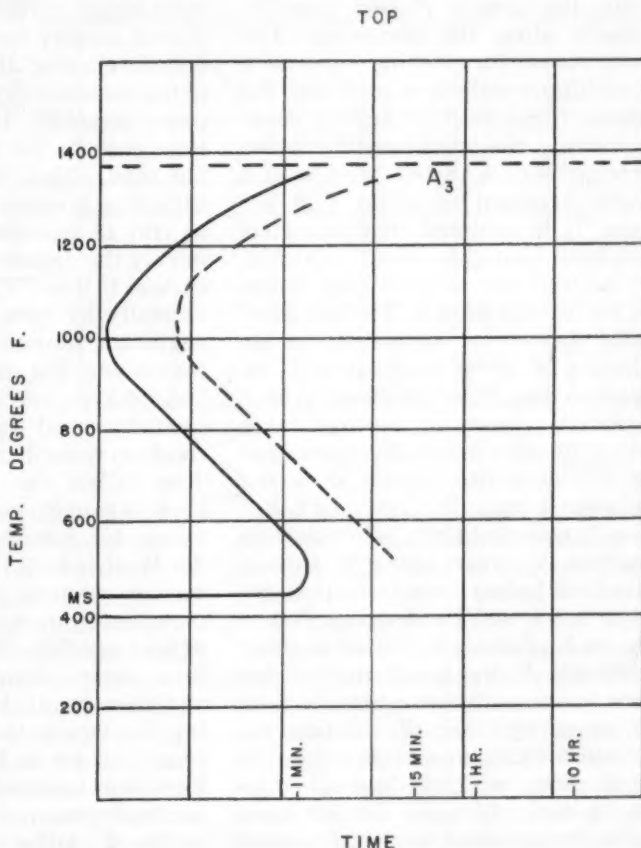


Fig. 5—Approximate transformation characteristics of a water-hardening type of tool steel, typical of those belonging to Class 3, Table I.

If cooling takes place slowly from this elevated temperature, the structure will generally revert to something near what it was originally, but if cooling takes place much faster, other structures can be formed, depending upon the transformation characteristics of the particular steel and cooling rate. There is some similarity among all of the steels relative to transformation from the elevated temperature condition.

Taking Fig. 5 as an example, the temperature in degrees F. is plotted vertically along the left-hand side while the time is plotted logarithmically along the horizontal. The only reason for plotting time on a logarithmic scale is to minimize the width of this chart. This TTT curve represents the transformation characteristics of a carbon steel with a carbon content of about 1.00 per cent. It is assumed that this steel has been heated to about 1450 deg. F. or into the austenitizing range, as we usually term it. The left-hand solid line curve represents the beginning of transformation with respect to time from this elevated temperature phase as cooling takes place. In other words, decomposition of the austenite crystal does not take place immediately; in fact, if it is only cooled slightly below the line marked A_s , some period of time is required before transformation begins, but it will be observed that as the cooling rate is decreased to about 1050 deg. F. the transformation begins in a much shorter time. In fact, at about 1050 deg. F. the time required for transformation to start is almost zero, which is determined by the distance between the left-hand side of the chart and the nearest

point on the left curved line.

It will also be observed that if transformation in this region can be avoided it does not begin as nearly as fast as the temperature is decreased to 500 to 600 deg. F. The formation of martensite does not take place until the temperature has reached about 450 deg. F. which is indicated by the M_s line. In other words, in order to successfully harden this steel it is essential that it be quenched with extreme rapidity, which could be accomplished only by the use of water or brine. The right-hand curved line, which is dotted, merely indicates the end of transformation; this decomposition of the austenite crystal does not take place instantly, but requires some time even in the instance of a carbon steel, although in this steel very little time is required from beginning to end of transformation which is merely the distance between the two curves. If this TTT curve is studied carefully by some of the older tool engineers, they may readily see the reason why the old and well-known "toolmaker's quench" was often successfully used for hardening the common water-hardening tool steels. The author can easily remember, back to over 30 years ago, visits to a village blacksmith shop in the Middle West, where its proprietor, who was a genuine craftsman, heated plow shares made from carbon steel in his forge fire after which he would first quench them quickly in water and then in oil. His reason for doing this was so that they would not crack and yet be hard and strong as he stated. Certainly this blacksmith had no knowledge of the TTT curve, but he was following it all the while.

Fig. 6 — Approximate transformation characteristics of an oil-hardening type of low alloy tool steel—typical of those belonging to Class 4, Table I.

The mechanism was that the hot steel was quenched into a drastic quenching medium which brought it down below the 1050 deg. F. range where transformation began so quickly, and into the range, still on the left-hand side of the beginning transformation curve, where rapid cooling was no longer necessary and the quench could be satisfactorily finished in oil. Oil, being a far less drastic quench, cooled the parts slowly through the martensite formation range where volumetric changes do take place, and allowed the parts to become finished without cracking, which, no doubt, would have taken place had the parts been cooled quickly down to room temperature by means of water.

Therefore, Fig. 5 shows the transformation characteristics possessed by a steel of straight carbon content such as that indicated as Class 3 in

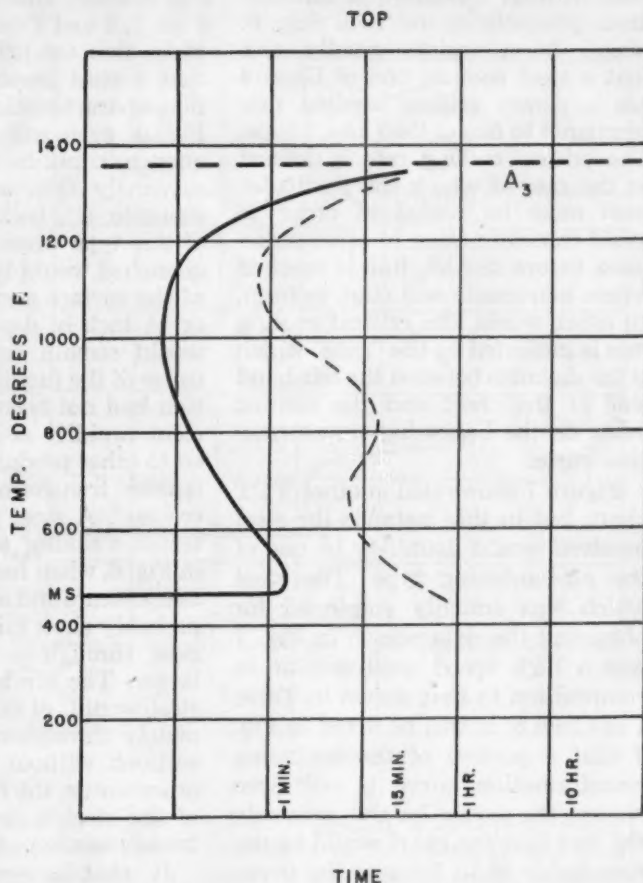


Table I. Figure 6 shows a similar chart for a steel which would generally be classed as an oil hardening type such as the one shown in Table I as Class 4. It will be noted that the general characteristics of the curve are similar with exception that the beginning transformation line has moved appreciably to the right, which merely means that there is more time allowed for quenching down to the lower temperature range where martensite begins to

form without formation of intermediate products in the 1050 deg. F. range. Metallurgists usually say that a steel such as one of Class 4 has a slower critical cooling rate compared to one of the Class 3 type. The critical cooling rate is defined as the rate at which the particular steel must be cooled in order to avoid transformation to other structures before the M_s line is reached where martensite will start to form. In other words, the critical cooling rate is indicated by the "gate" which is the distance between the left-hand side of the chart and the nearest point on the beginning transformation curve.

Figure 7 shows still another TTT chart, but in this instance the steel involved would definitely be one of the air-hardening type. The steel which was actually employed for obtaining the data shown in Fig. 7 was a high speed steel similar in composition to that shown in Table I as Class 8. It will be noted in Fig. 7 that a portion of the beginning transformation curve is not even shown; the reason for this is merely the fact that the chart would be unreasonably wide, because the transformation in such regions does not begin for an appreciable length of time. In other words, any steel which possessed transformation characteristics simulating those shown in Fig. 7 would fall within the air-hardening class.

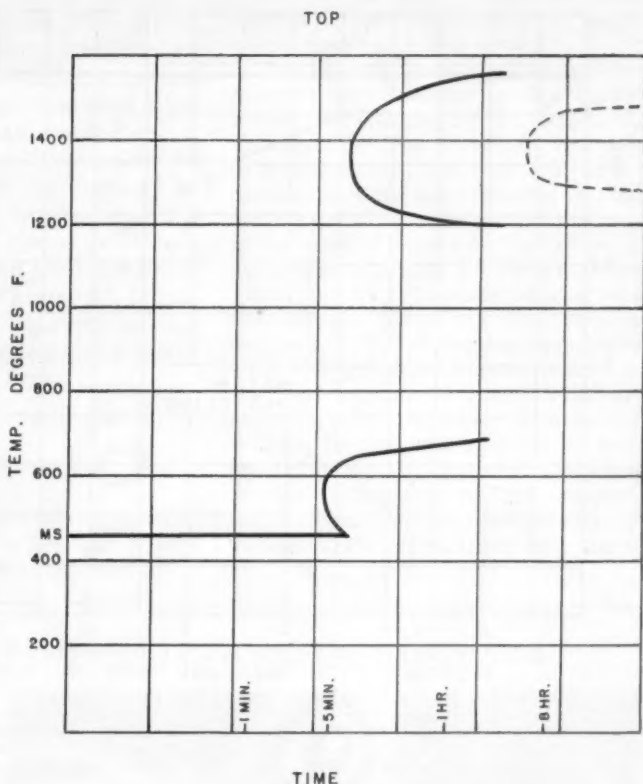
It is well known to most of those who have been associated with making and heat treating tools that some steels will harden completely through sizable sections while other steels harden at the surface only, the center remaining relatively soft

and ductile. Illustrations shown in Figs. 5, 6 and 7 certainly tend to explain this condition. It is obvious that a steel possessing transformation characteristics as depicted, in Fig. 5, even with the most drastic quench, could be fully hardened in extremely thin sections only. For example, a 1-inch round of a steel of this type when heated and water quenched would be found fully hard at the surface and perhaps for 1/16 or 1/8 inch in depth, but the center would remain essentially soft, because of the fact that the center portion had not been cooled with sufficient rapidity so that it transformed to other products before the martensite transformation point was reached. A steel possessing characteristics similar to those illustrated in Fig. 6, when heated to an elevated temperature and oil quenched, would probably show fairly near full hardness through a 1-inch round or larger. The air hardening types of steel would, of course, harden completely throughout relatively heavy sections without any question. In other words, the hardenability value of the steel is dependent upon the transformation characteristics.

It must be remembered that the term hardenability does not refer to the maximum obtainable hardness in any specific steel for this value is due primarily to the carbon content. The term hardenability refers to capacity or depth of hardening. In other words, a low hardenability steel is commonly known as a shallow hardening steel while a higher hardenability steel is one of the deeper hardening type. The practice of evaluating steels on a hardenability basis has gained a great deal of momentum in this country

Fig. 7 — Approximate transformation characteristics of an air-hardening tool steel such as shown in Table I as Class 8.

in the past few years, particularly with regard to our constructional steels. Although the latest method of evaluation has been used mainly for the engineering or constructional types of steel, it is now used to a limited extent in evaluating hardenability values of the tool steels. Briefly, the method consists of heating a bar of the steel to be tested to a temperature adaptable to the specific steel and quenching one end only of the hot bars by means of an impinging water column. The test specimen is generally 1 inch in diameter and about 3 inches in length. The apparatus and details of the method of testing are completely described by The American Society for Testing Materials. The result is that one end only is cooled by the most drastic means, which is flowing water. It is easy to understand that the remainder of the bar is cooled at various rates up to the opposite end which receives essentially a still air cool. Hardness is then test-



ed at 1/16-inch intervals all along the bar from the quenched end to a point where the hardness remains constant.

Figure 8 is a portion of a hardenability chart showing the approximate hardenability value for three of the steels under discussion. At the top of the chart is shown the hardenability characteristics of an air-hardening steel such as shown in Class 8, Table I. It will be noted that it is no harder at the end receiving the water quench than at a point much further up; in other words, the hardenability curve for an air-hardening steel is a straight

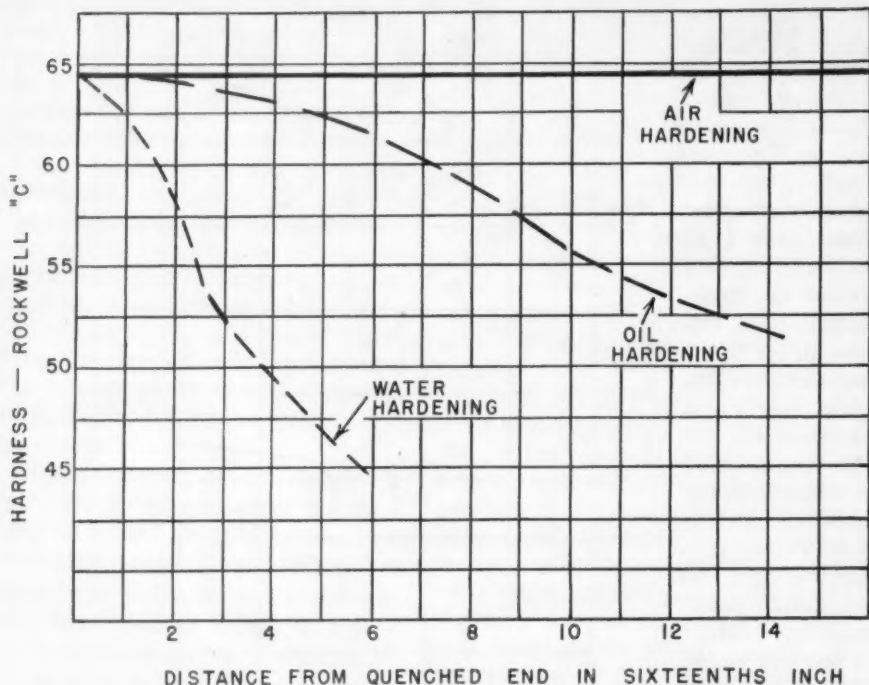


Fig. 8—Typical end quench hardenability curves for water, oil, and air-hardening steels. The complexity of tool steel classifications can be simplified to some extent by dividing them into groups. This table shows one method which divides them into nine groups. Most tooling applications can be covered by compositions similar to those shown.

line. Many persons have had the idea that the hardness of any steel could be increased by drastic quenching methods, even though the steel was of the oil-hardening or air-hardening type; but this is not true. Martensite is martensite and as long as the steel is cooled with sufficient rapidity to form martensite there will be no essential difference.

The next curve shows a typical hardenability curve for an oil-hardening type of steel. In this instance, it will be observed that the curve starts at about the same maximum value, but gradually drops in hard-

ness value as the distance from the quenched end of the specimen is increased. The hardness at 4/16 inch has decreased only about two points Rockwell "C", but a 6-point drop is noted at the 8/16-inch line and so on down as shown on the oil hardening curve. Even though this type of steel does not produce anything near a straight line, it could be denoted as a fairly deep hardening steel or one possessing a relatively high hardenability value. This type of curve is about what might be expected from a 1 per cent carbon low alloy steel such as shown in Table I as Class 4. The curve denot-

ed as Water Hardening is one which illustrates the approximate hardenability value expected for a typical straight carbon alloy free steel similar to that shown in Class 3, Table I. It will be noted that this steel shows a high maximum hardness, but drops off rapidly as the distance from the quenched end is increased; in fact, even at 1/16 inch the hardness has decreased about 2.5 points Rockwell "C". In other words, this steel is termed as an extremely shallow hardening type.

(To be continued in the next issue)

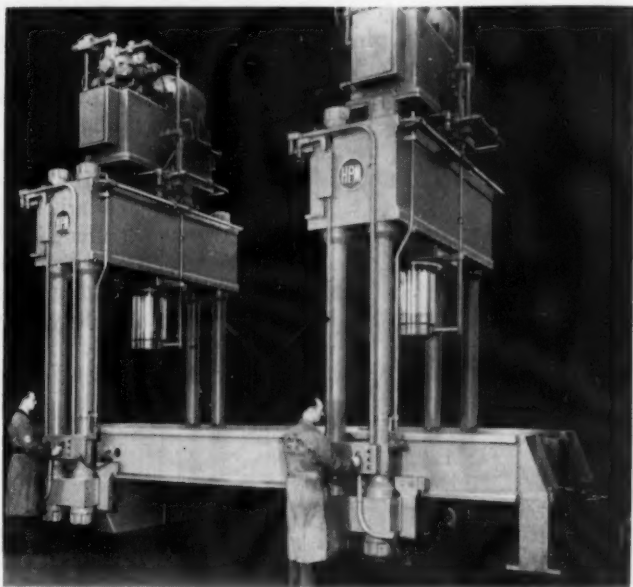
Manual of Excellent Managements.
1954 Edition. Published by The American Institute of Management, 125 E.

38th St., New York 16, N. Y. 96 pages. Cloth binding, board covers.

This manual lists the top 348 industrial organizations in the United States and Canada for the year 1953, as named by The American Institute of Management. The excellently managed companies are arranged in four basic lists, broken down alphabetically for ease of reference, by industry, geographically, and by the institute's rating within the 348 companies themselves. There are also supplementary lists showing the companies with the greatest growth potential, the best records of stability of net income, and the most outstanding outside boards of directors. A final listing shows the uninterrupted cash dividend records of all 348 companies. In addition, the manual briefly discusses the Management Audit methods of the institute.

Two-Way Straightening Press with Two Pressure Units

BELIEVED to be the first hydraulic press of its type, the two-way straightening press with two pressure units shown here-with has been built by The Hydraulic Press Mfg. Co. for Harvey Machine Co. The press is designed to straighten parts such as forgings, castings, extrusions and weldments, where it is necessary to hold down one point while applying pressure to another or apply pressure at two points at once.



Racks For Cylindrical Components

By FRED ROGERS

Illustrated and discussed are several designs of racks used with housing-enclosed spindles, solid type rods, and other cylindrically shaped members.

THE rack and pinion are the media for obtaining longitudinal movement of cylindrical components in many mechanical applications. This is especially so in the design of machine tools. Contrariwise, slidable members may be advanced in a similar manner along cylindrical components which are themselves stationary or fixed. In the first group are spindles enveloped in housings, quills or sleeves. Such spindles are advanced through a pinion engaging a rack which is fastened to, or is integral with, the spindle housing, quill or sleeve. These may be seen in drilling machines, vertical millers, profiling machines, jig borers,

and diesinking machines. Various types of small presses are also operated in a similar manner. In the second group, the rack is cut directly on a solid rod as used in universal drill jigs, bench drills, metal testing equipment, and other mechanisms which must be positioned along or on the rod or post.

The purpose of this article is to illustrate and discuss the several designs of racks that are used with cylindrically shaped members. Because group member two above is more simple than the first group, it will be explored first. If the load requirements are relatively light, the teeth may be cut directly on the round surface of the bar, as shown in Fig. 1; that is, without first milling a flat. The engaging pinion will mesh completely only on the center line where the tooth of the rack is cut full depth. The outer edges

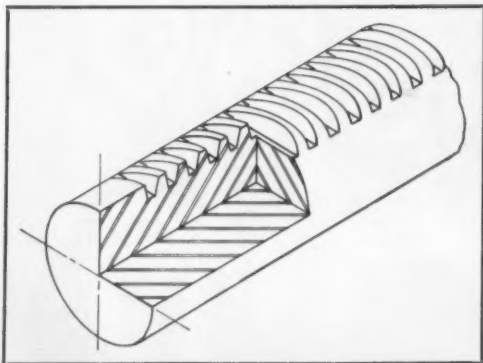


Fig. 1 — If the load requirements are relatively light, the teeth may be cut directly on the round surface of the bar, as shown in this sketch.

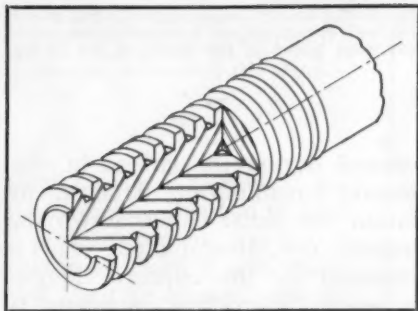
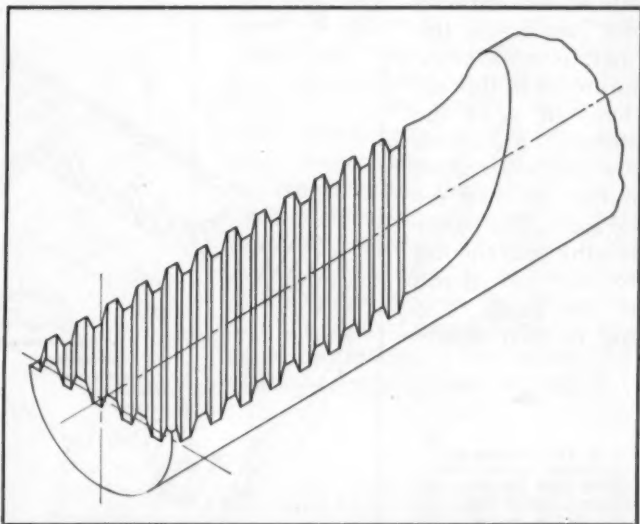


Fig. 3—This sketch shows a circular rack on which the teeth have been cut all around by means of a thread miller, geared for no lead.

of the pinion will engage only partially and this depending on the width. The edges of the rack teeth should be touched off so there will be no broaching or shaving action in the engaging hole, as the tops of the teeth still form part of the bearing with the mating piece. Such racks were observed in a German so-called universal drill jig. The two vertical pillars upon which the teeth are cut are connected to a top pressure bushing plate. A long pinion extending from one pillar to the other operates the pressure plate up and down.

When imposed loads are greater, a flat is first milled along the cylindrical stock on which the teeth are cut.

Fig. 2—When it is desired to reduce the center distances between the pinion and rack-cut rod, the latter may be flatted close to its axis, as shown in this sketch.



The flat can be the same or a trifle wider than the width of the pinion. In this manner, the teeth have 100 per cent contact. When it is desired to reduce the center distance between the pinion and rack-cut rod or pillar, the latter may be flatted close to its axis, as shown in Fig. 2. The addendum of the teeth rises above the axis while the dedendum is cut below the axis. The axis of the rod and the center line of the teeth coincide. In the example shown the teeth are cut at a 45-degree angle and engage a helical pinion. A small diameter mill is used to cut the flat. To conserve as much bearing surface as possible, the rod is set at 45 degrees to the mill, leaving a cut as illustrated. If it were milled straight across, bearing surface on

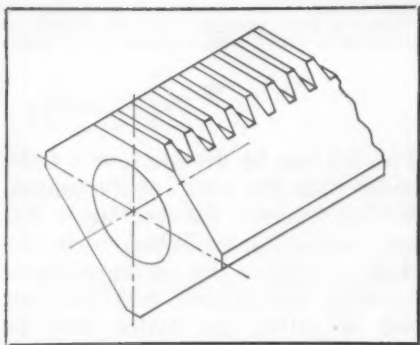


Fig. 5—The square sleeve shown in this sketch has teeth cut across one corner after the corner has been flattened to the width of the pinion.

the rod would be sacrificed. As the rod is cut down so far, practically half the bearing surface is lost anyway. If the teeth need not be cut to the very end, the rod could have a full bearing of 100 per cent either end of the teeth.

The application shown in Fig. 3 is actually a circular rack and not an Acme or worm thread screw as might appear at first glance. When the shaft must rotate and be actuated axially, then the teeth must be cut all around and not just across the shaft as in the other examples in this article. In this instance, the teeth are cut on a thread miller, geared for no lead. The cutter is sunk into the rod to the full depth of the tooth. The rod is then slowly

rotated during the cut as in customary thread milling. After one rotation, the cutter is withdrawn and indexed one circular pitch. This is repeated for the required number of spaces. It was first considered to be a lathe job but the finish and the accuracy were found to be enhanced by means of the thread milling method. This circular rack is actuated axially by a $14\frac{1}{2}$ -degree involute pinion. The application proved quite satisfactory; however, the speed of rotation was very low. Both rotating and axial motion are performed simultaneously.

When rack teeth are cut on a cylindrical piece that is hollow, several things must be considered. First, is there enough wall thickness to first cut a flat and then a full depth of

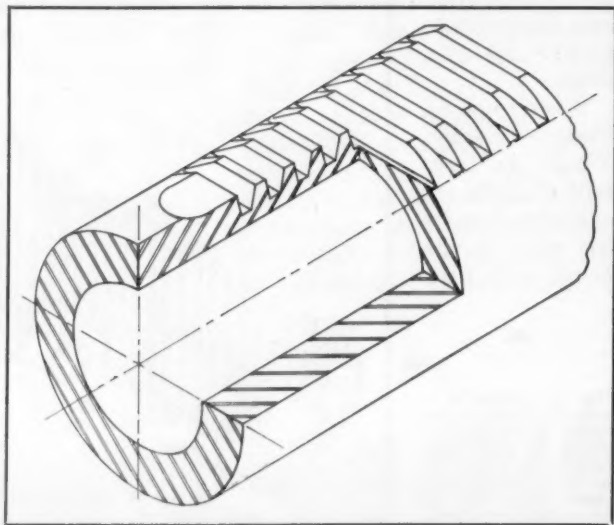
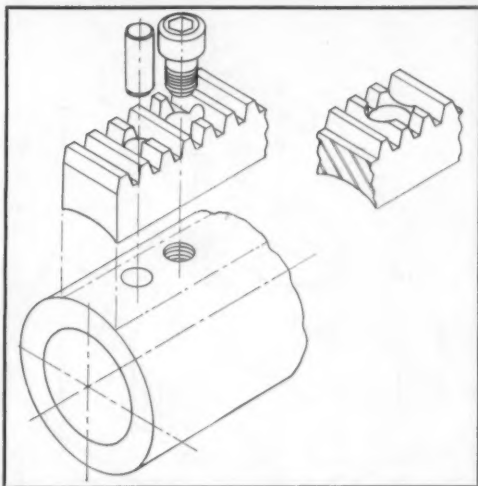


Fig. 4—This section drawing shows the manner in which rack teeth can be cut on a cylindrical piece that is hollow.

Fig. 6—When the sleeve has a wall thickness that will not warrant a flat or slot on its periphery, the rack can be attached as shown in this sketch.

tooth on the flat? Second, can the sleeve be changed to steel, if sections become too thin in cast iron? Third, if sections are still too thin in steel, can the whole sleeve be carburized and hardened? Fourth, if it is heat treated, do the teeth have to be ground or at least lapped? The drawing in Fig. 4 points up these four considerations. The larger in diameter, the less is the depth of the original flat that has to be cut, of course, depending on the width of the actuating pinion. The sketch shows the ends of the teeth on the cylindrical portion as being bearing surfaces. As stated previously, the corners should be dressed so as not



to present shearing edges. Some designers prefer to mill angular flats as reliefs for the ends of the teeth at the approximate angle of the curvature, from the bottom to the top of the teeth.

The title of this article belies the fact that the rack application in Fig. 5 should appear. However, it is an interesting example even though it is a square sleeve or ram. Such a shape has been applied to a tail-stock spindle and as the ram of a small press. The teeth are cut across one corner rather than across one of the flat sides, after the corner itself has been flattened to the width of the pinion. In this design the top part of the housing is in the form of a cap, the joint of which is on the diagonal center line of the square. Adjustment for a proper sliding fit is

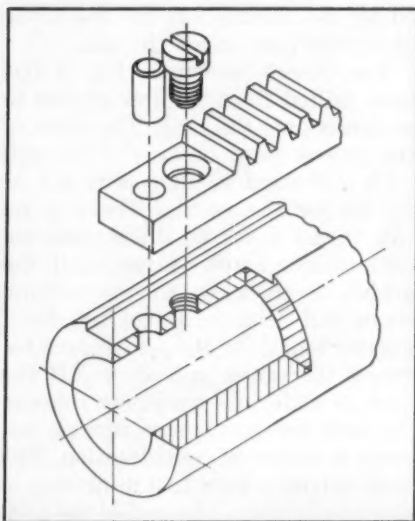


Fig. 7—The sleeve shown in this sketch has been milled for a shallow groove to accommodate the rack.

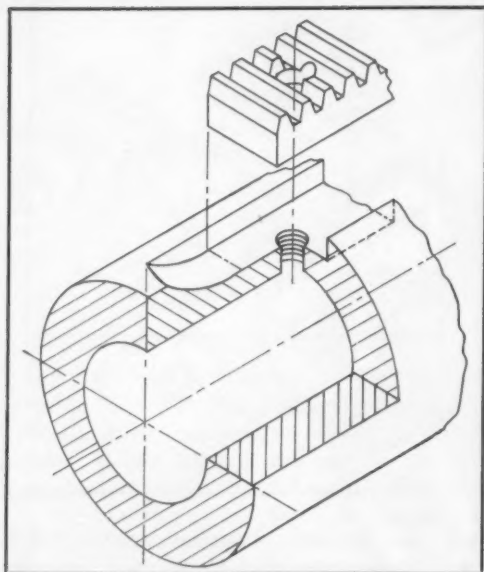


Fig. 8—This sketch shows a heavier design of sleeve and rack, the wall thickness of the sleeve being sufficient for a deep slot to be cut.

the hole falls on the center of a tooth. This condition can be seen in the rack directly above the sleeve.

Although the pin is shown similarly, if the diameter is not too great, it might enter between the teeth. In the auxiliary view to the right, the counterbore is shown cutting away much of two teeth if drilled in the center of the space between two teeth. The depth of counterbore is such that the top of the screw head falls below the

bottom of the tooth. Therefore, the pinion could have a little more travel. It is here that the pinion teeth could contact only a partial width of rack tooth because of the portion removed by the counterbore for the screw or by the reamer for the pin.

The sleeve shown in Fig. 7 has been milled for a shallow groove to accommodate the rack. The sides of the groove need be only 1/16 inch high if desired as they only act as guides for the rack. There is no side thrust as a rule if the teeth are cut straight across. Usually, if the groove depth is kept at a minimum, there will be more metal left for a greater length of thread contact between the screw and sleeve. If the rack is wide, the thickness remaining and the number of threads become a matter of consideration. The rack height is kept to a minimum in this application. The end of the rack

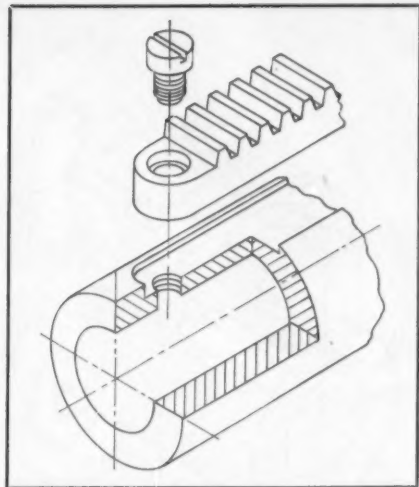
easy to maintain either by laminated shims or by draw-filing the joint surfaces of the cap.

In the first five examples, the teeth have been cut directly on the piece itself; that is, integrally. In the remaining drawings, the rack is attached and retained by means of screws, pins, dovetails and keys. When the sleeve has a wall thickness that will not warrant a flat or slot on its periphery, the rack can be attached as shown in Fig. 6. The bottom of the rack is milled to the curvature of the sleeve and fastened to it by several fillister or socket head cap screws. Because of the freedom of the screw in the drilled and counterbored hole in the rack, end thrust is taken by a close-fitting dowel pin or even two pins if desired. In a rack having 6, 8 or 10 diametral pitch teeth, less tooth surface is cut away if the center of

Fig. 9 — The method of attaching the rack shown in this sketch precludes the use of a dowel pin.

is cut down even with the root of the tooth. The holding screw has a thinned, slotted head and the hole is counterbored so that the screw head is flush after the rack is assembled. Both ends of the rack are the same as shown. The slot in the sleeve runs the full length. When the screw head and pin are flush, the pinion can overtravel without interference.

A heavier design of sleeve and rack is illustrated in Fig. 8. The wall thickness is sufficient for a deep slot to be cut. The circular cutter used does not break out at the end of the sleeve. The rack is of such thickness that the bottoms of the teeth are flush with the sides of the slot. The end of the rack comes to the center of the cutter. In this example



as in the last one, a thin headed screw is used, the top of which is flush with the bottom of the teeth. The body size of the screw hole is reamed to fit the screw closely so that no dowel pins are used in this design. The rack in question was fastened with three such close-fitting screws. The teeth are cut the entire length of the rack. Such racks can be tooth-milled in long strips and cut off to the required length. The sleeve is made of cast iron.

The method of attaching the rack shown in Fig. 9 also precludes the use of a dowel pin. The slot in the sleeve is end milled to within about $\frac{1}{2}$ inch of either end. The rack is radiused at the ends and fits the slot snugly end wise. Here also the side

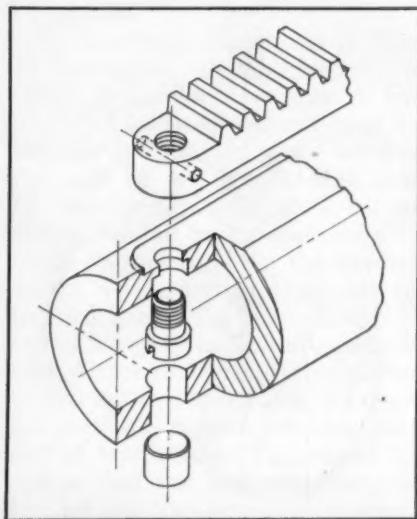


Fig. 10—The design shown in this sketch is claimed to eliminate loosening of the slotted head screws used in fastening the rack to the sleeve.

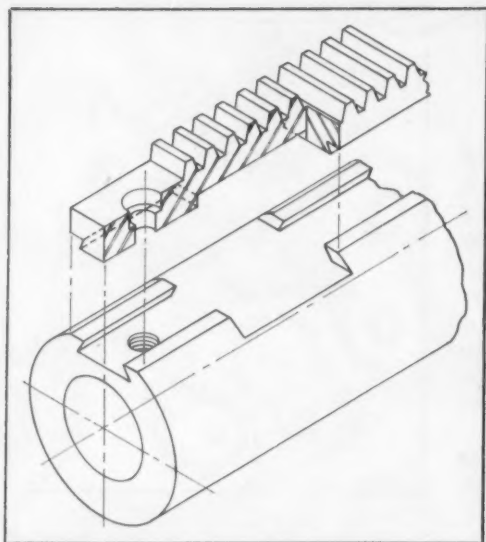


Fig. 12—In this design, both the dovetail on the rack and in the sleeve are milled away to facilitate assembling.

screw threads are better in steel rather than in the cast iron sleeve. Also, there is a greater length of thread engagement. To prevent loosening of the screw where such would cause damage to a rotating spindle, the rack is cross-drilled after the screw is driven home. A pin is then pressed into the large reamed hole in opposite wall to avoid leakage of spindle lubricant.

Another method of end thrust absorption is portrayed in Fig. 11. An end mill is used to cut a flat on the sleeve to within $\frac{3}{4}$ inch to either end. The flat is about $\frac{1}{4}$ inch wider than the rack. When the cutter reaches the

wall of the slot can be as shallow as $\frac{1}{16}$ inch, but on the center line about twice this amount is available for end thrust against the rack. A thin slotted head screw is used.

Some machine designers dislike to use thin slotted head screws. They claim that in time vibration loosens them to cause damage to the pinion. Therefore, a design such as that shown in Fig. 10 is used. The slot is milled but without sidewalls, the width of the flat being the same as the width of the rack. There is enough wall at the end of the cut to absorb end thrust. The screw hole is drilled in from the opposite wall. It is counterdrilled, counterbored, and the first wall reamed thereafter. The rack is tapped out. With this method it is maintained that the

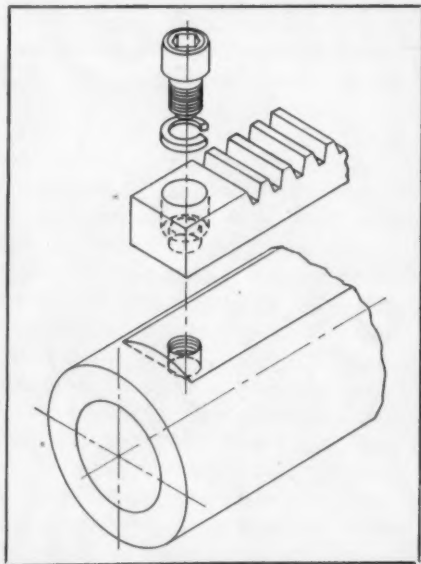
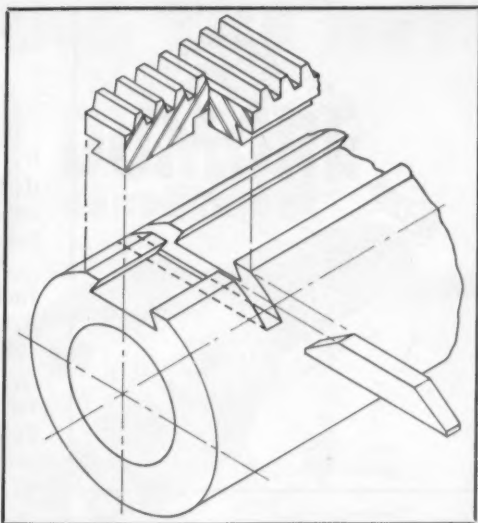


Fig. 11 — Another method of absorbing end thrust of the rack is depicted in this sketch.

Fig. 13—This sketch shows a rack and sleeve assembly in which both pieces are dovetailed.

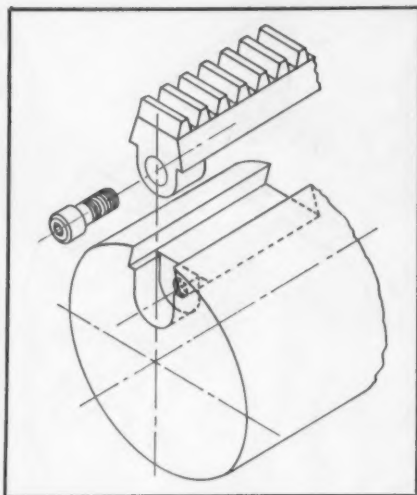
end of the cut, it is fed cross-wise to form a shoulder at both ends as shown. The length of the rack is made to fit tightly between these two shoulders. As the rack must be centered and stay there, the body-size hole is reamed so that the upper body of the screw, under the head, acts as a dowel pin also. The depth of counterbore is such as to accommodate a lock washer under the screw head. The screw head is socketed and is full height—not thinned as in previous examples. However, the rack is long enough so that the ends do not have to be cut with rack teeth or relieved for same. Therefore, enough thickness of metal is available for a deeply counter-bored hole.

In the design illustrated in Figs. 12 through 15, the racks are dovetailed on the lower surfaces. In two instances, a flat is first milled along the sleeve upon which the sides of the rack beyond the dovetail rest. In the other two designs, the bottom of the dovetail on the rack rests directly on the bottom of the dovetail on the sleeve. Both the dovetail on the rack and in the sleeve in Fig. 12 are milled away to facilitate assembling. Although a break is not shown in this flat in either piece, the dovetail portion is supposed to be at each end of both pieces. The reason for this is that the rack need only be pressed into the sleeve for a distance



of about $1\frac{1}{2}$ times the width of the dovetail. This is in preference to sliding it along the entire length of the sleeve. However, the result is that a space or void is left between the rack and sleeve after assembly where there is no dovetail. This causes no difficulty as the sleeve is enclosed in a housing and the opening is not visible most of the time. The retaining screw acts as a dowel in a close-fitting hole.

In 1926, an advertisement appeared in one of the mechanical trade papers showing a rack and sleeve assembly made by Barnes Drill Co., Rockford, Ill. A sketch of this assembly is provided in Fig. 13. Both pieces are dovetailed. The sleeve is slotted across, and deeper than the dovetail near one end, as shown. The rack is slotted to the depth of the dovetail. A key, milled angularly at each end, is then pressed into the slot after assembly. The advertisement read as follows:



"Dovetail method of attaching rack to sleeve. Key takes thrust. No screws to shake out and wreck the feed mechanism."

The bottom of the rack shown in Fig. 14 rests against the bottom of the dovetail groove in the sleeve. There is no extra flat on the sleeve each side of the slot. The rack teeth are cut slightly narrower than the top of the dovetail so that the pinion will not interfere with the sleeve. A hole is drilled at the joint between sleeve and rack, half in each piece. The hole is reamed after assembly for a tapered pin. The ends of the pin are flush with the milled-out pockets so that there is no possibility of interfering with the sliding movement of the sleeve. The pockets also facilitate drilling where-

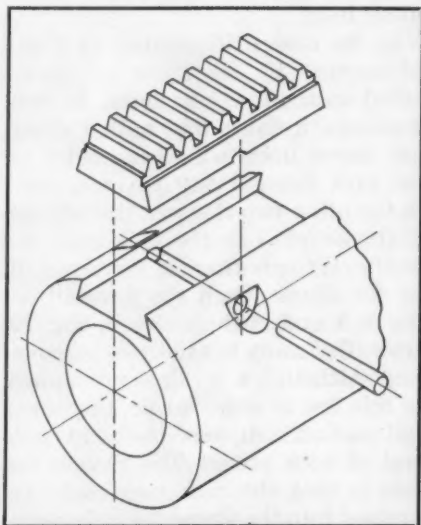
Fig. 14—The bottom of the rack shown in this sketch rests against the bottom of the dovetail groove in the sleeve.

Fig. 15—This sketch shows another method of fastening the rack, utilizing a boss milled at one end of the rack which fits into a milled opening at the end of the sleeve.

by flat surfaces are presented to the drill point for starting and terminating. Screws to hold the rack are not required.

Another method of fastening the rack is shown in Fig. 15. To avoid drilling and counterboring through the teeth, a boss is milled at one end of the rack. This boss fits into a milled opening at the end of the sleeve. It is drilled and counterbored for a socket head cap screw. The bottoms of the teeth are just above the sides of the dovetail slot in the sleeve. The rack rests on the bottom of the dovetail groove.

Another interesting sleeve and rack assembly (not shown) is that for extending the telescoping sleeve in a surveyors transit. The sleeve is slitted and the metal each side of



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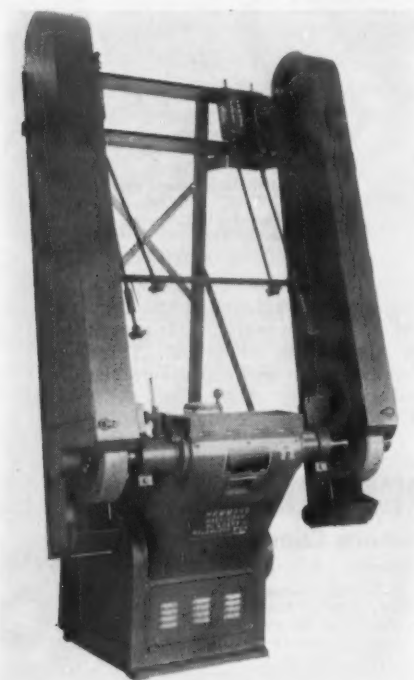
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the slit is pressed inward to form a shelf upon which the rack is fastened. The pinion extends through this opening to engage the rack on the inside of the sleeve. The pinion adjusting knob is centered in a bracket fastened to the outside tube of the telescope. The pinion is situated on the horizontal center line of the sleeve.

Handbook of Standard Time Data.
By Arthur A. Hadden and Victor K. Genger. Published by The Ronald Press Co., 15 E. 26th St., New York 10, N. Y. 473 pages. Cloth binding, board covers. Price, \$10.00.

This book makes available detailed standard time data which have been

developed in the authors' professional practice over a period of more than 25 years and used in many well-known companies. The tables have been set up so that they can be used quickly and easily. The tables can be used in bid and quotation work, to prepare estimates and to calculate sub-contract work time. In production planning, the tables will help to determine economical sequences of manufacturing operations; to determine departmental loads and the loads of individual machines; to establish realistic production schedules; and to make methods analyses. The tables can also promote efficient shop management because they are designed to help establish uniform production schedules which are consistent with required effort, as well as shop policies consistent with engineering requirements.



Interesting Polishing Lathe- Backstand Installation

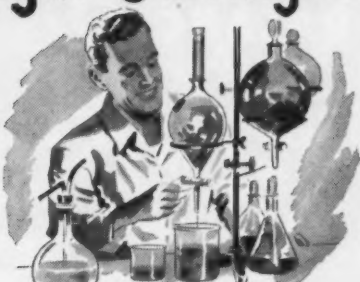
THE accompanying illustration shows an interesting installation of a polishing lathe and abrasive belt backstands which is said to be particularly useful in plants where abrasive belts can be employed to advantage, but limited space makes it impractical to install the backstands in back of the polishing lathe. The mounting structure is attached to the base of the polishing lathe to which the backstands are mounted. Abrasive belts up to 14 ft. long can be used. The polishing lathe is a Hammond Model VRO Variable Speed (1500 to 3000 r.p.m.) unit, and the backstands can be either spring or air-tensioned models. The same arrangement can be furnished with most Hammond polishing lathes.

How to Pick the Right Cutting Oil



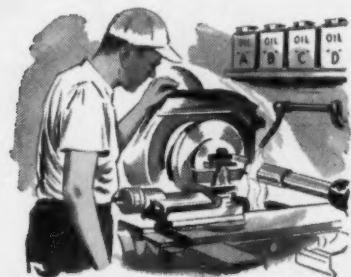
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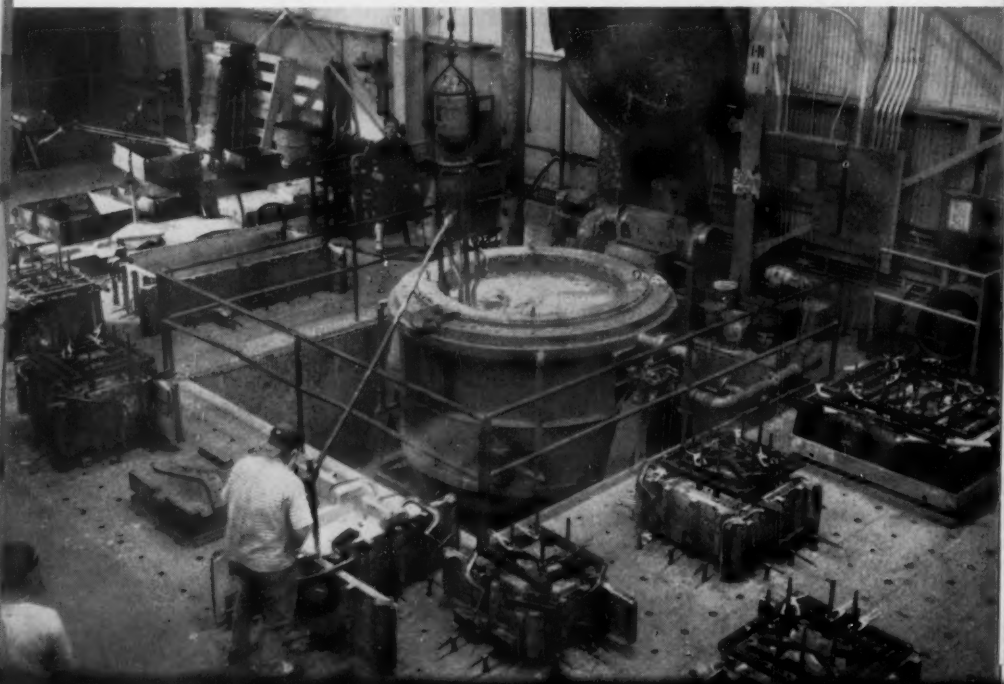
By GILBERT C. CLOSE

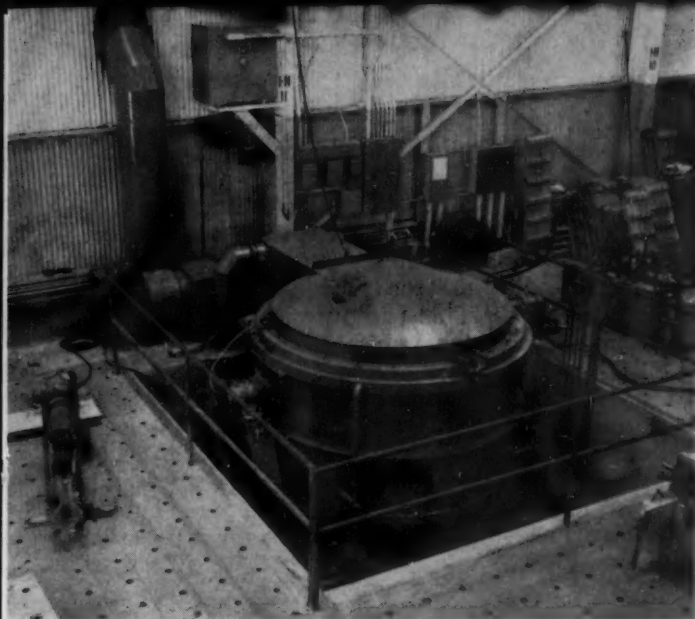
This article points out how, in the new El Segundo plant of Douglas Aircraft, the latest in soft metal auxiliary foundry techniques and equipment were engineered together into a comprehensive layout.

WHILE modern foundry practices and techniques have improved greatly in recent years, these improvements seldom find their way into the small auxiliary foundries operated in many plants and factor-

ies for the sole purpose of turning out the many various soft metal (lead and Kirksite) impact and pressure dies for drop hammers, Cestostamps, stretch presses, and so on. In many of these small auxiliary

General view of a new oversize pot in the Douglas foundry, with the Douglas-designed metal pump being used to pour Kirksite tooling dies. Note semi-circular arrangement of mold boxes around unit. Pouring spout may be swung from one mold box to the next.





In this view, the auxiliary pump has been laid aside while the pot cover is tightly closed for melting. An overhead crane is used to handle the pump.

niques and equipment were engineered together in a comprehensive layout. Douglas tooling engineers went even further and designed some equipment that

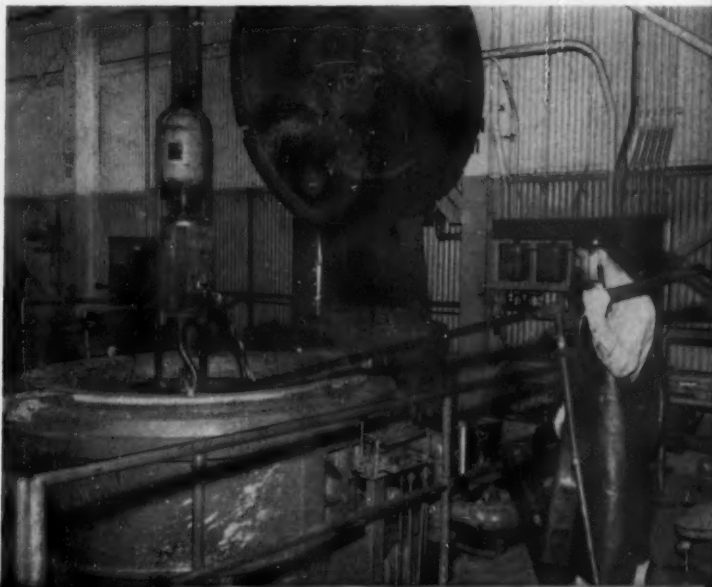
foundries, operations are conducted much as they were twenty years ago. However, in the aircraft industry, where soft metal forming dies are used by the thousands, more attention is being paid to these auxiliary foundry practices.

In the new plant recently opened by the El Segundo Division of Douglas Aircraft Company at Torrance, California, the very latest in soft metal auxiliary foundry tech-

is not as yet commercially available.

Principal features of this new foundry layout are the oversize melting pots with their auxiliary metal pumps for pumping the molten metal directly into the molds, and the new, completely automatic

Close-up view of the metal pump in action, showing molten metal pouring under static pressure from the container into which it is raised by pump action.



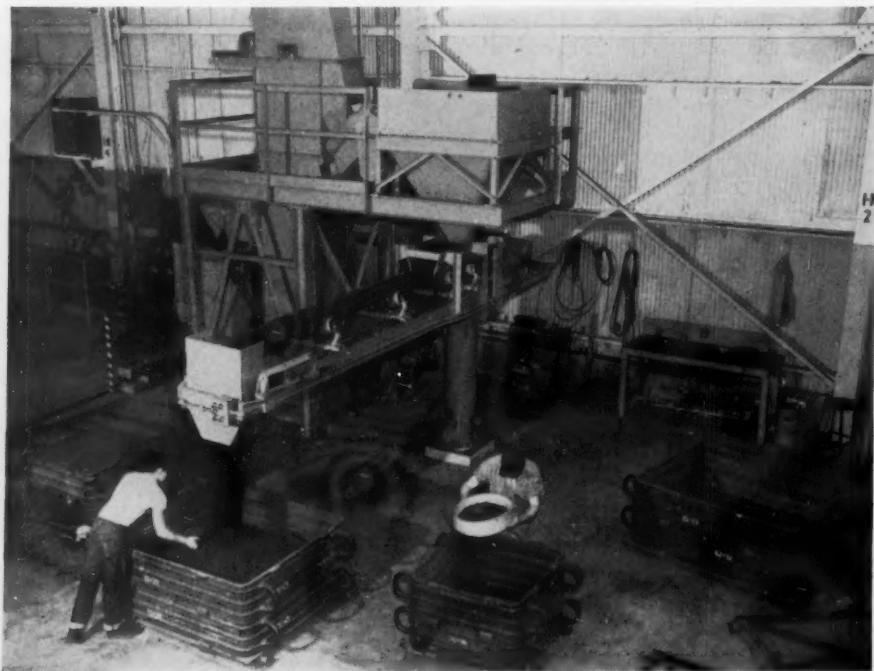
sand reconditioning installation. Together, these two features eliminate almost completely the back-breaking work so often associated with foundry practices. Furthermore, they contribute to consistent tooling die quality and increase die production speed considerably.

The oversize melting pots, each with a capacity for 42,000 lb. of Kirksite or 56,000 lb. of lead, permit entire dies to be inserted for remelting. The old practice of breaking up dies to be remelted (sometimes accomplished by storing them outside in the snow so they will become brittle) is entirely eliminated.

Secondly, after the melt is accomplished, there is sufficient molten metal for pouring numerous new dies before a new melt is required.

An added feature to these oversize melting pots is the Douglas-designed auxiliary metal pump. This pump provides several advantages. First, when inserted in the melt, it draws molten metal from the bottom of the pot and is not bothered by any slag that may be floating on the surface. Secondly, installation simplicity was greatly facilitated by designing the pump auxiliary to, rather than as an integral part of the melting pot. When the pump

General view of the new Douglas sand reconditioning installation. Old sand is poured through floor grating at far left and then raised by cup conveyor to the reconditioning unit mounted on the overhead platform. Conveyor belt and nozzle may be swung in an arc to fill mold boxes arranged in a semi-circular pattern around reconditioning unit.

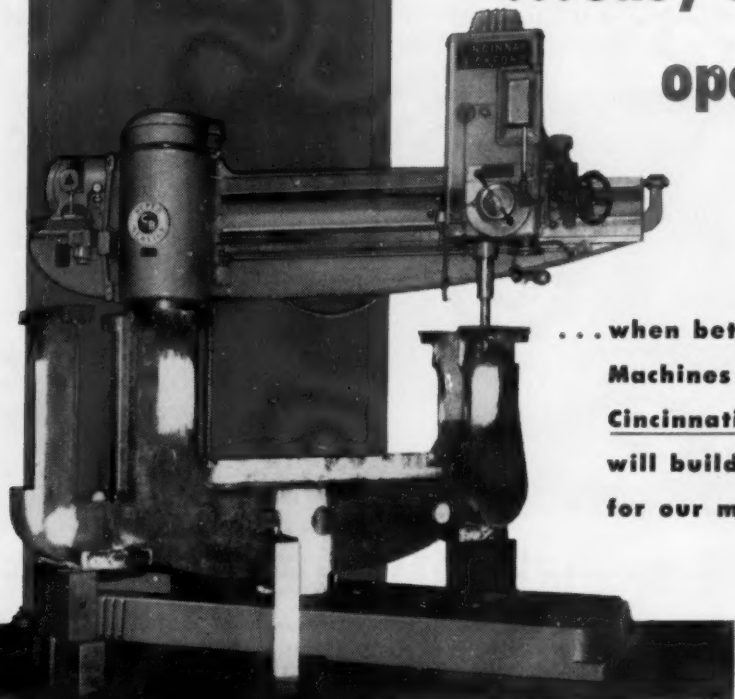


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is to be used, it is hoisted by an overhead crane and lowered into the melt. When not in use, it is raised from the pot and laid aside so that the pot cover can close tightly during the melting period.

The pump itself is of the centrifugal type, driven by a 5 h.p. heat-insulated motor. The metal used in

mold under pump pressure.

The spout used to conduct the molten metal from the pump static pressure tank to the mold is mounted by flexible couplings so that it may be raised or lowered or swung in any direction at will. Thus, when a number of dies are to be poured at one time, the molds are set in a



Illustrations showing previously used methods of pouring molten metal at Douglas. Left view shows a ladle being filled and how easily slag can get into the ladle. Right view shows ladle being used to fill a mold.

its construction was carefully selected for its corrosion resistance to heat and to the alloying constituents used in any of the casting metals. The pump itself merely delivers the molten metal to a static pressure vessel built on one side of the pump motor housing. The molten metal is then fed by static pressure only from this container through a spout pipe and into the mold. This arrangement affords absolute control over the pouring rate, which is not affected by "surges" that would be bound to occur if the metal was delivered directly to the

semi-circular pattern around the melting pot and then filled in turn by swinging the spout from one mold to the next. A manually-operated shutoff valve on the pouring spout's outer end provides additional control over pouring speed.

At Douglas, the wooden mold boxes are being rapidly replaced by standard-size steel boxes. These steel boxes completely eliminate tedious wooden box setup and clamping, thus increasing production speed.

The sand reconitioner in the new Douglas foundry, while found



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in many large commercial foundries, is seldom used in auxiliary foundry work. Yet Douglas engineers are already convinced that this installation is well worth its cost. Shoveling of sand is entirely eliminated, and fully reconditioned sand with just the right moisture content is constantly available.

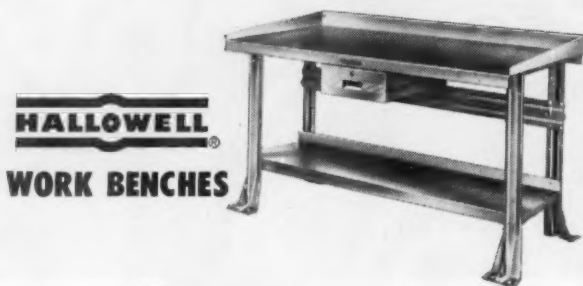
The reconditioner installation

consists of a 20-ton sub-floor sand hopper into which the old sand is dumped through a floor grating. The sand is fed from this hopper via an 18-inch conveyor belt into a smaller hopper where it is picked up by a belted cup conveyor and carried to an elevated sand reconditioning unit (a Royer unit in this case). When the sand leaves the re-

conditioning unit, it drops onto another 18-inch belt conveyor, mounted on a swivel, which carries it outward and into a spout which directs it downward into the mold box. Here again the mold boxes may be set in a semi-circle around the reconditioner and then filled in turn by rotating the spout.

A solenoid-controlled water shut-off valve admits just enough water to bring the sand's moisture content up to par as it passes through the reconditioning unit. While the amount of water admitted

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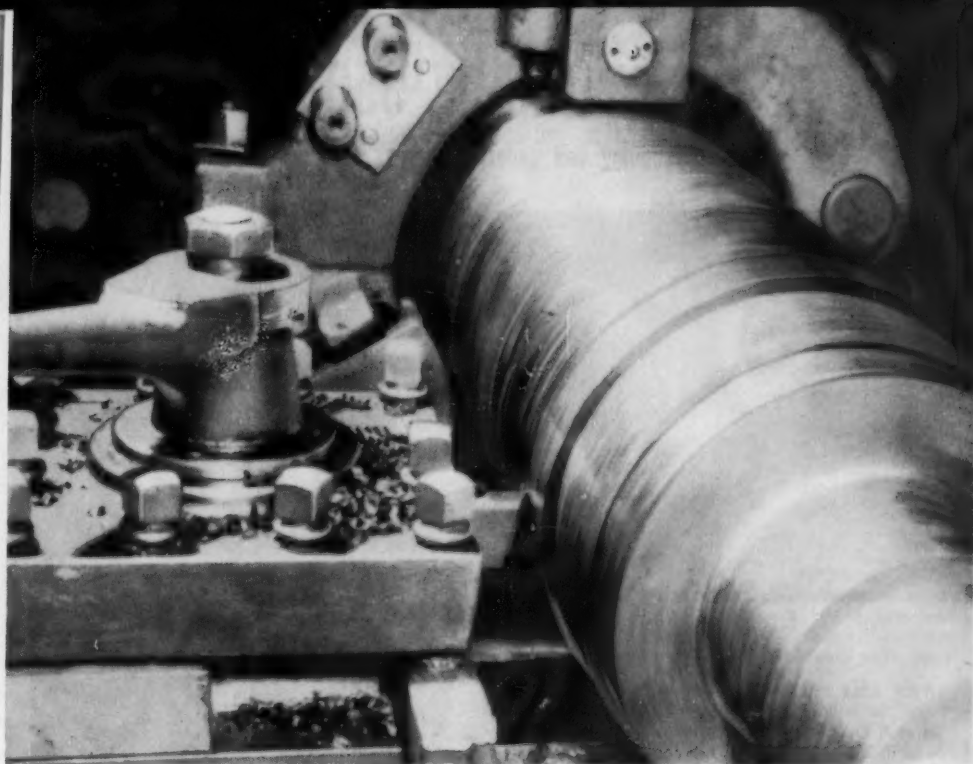
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is manually controlled, the solenoid acts as an automatic shutoff when operation of the sand reconditioner is stopped.

A humorous anecdote is told concerning the installation of this new sand reconditioning unit, and admitted by the fellow who was "the butt of the joke." This fellow, an old Douglas foundry hand, viewed the new installation scornfully and then declared that he could shovel sand faster than it was coming out of the spout. An obliging foreman arranged a "speed" contest. After 10 minutes, sweating profusely and falling rapidly behind, the fellow tossed his shovel aside.

"That tossing aside of the shovel," says the foreman, "marked a new era in Douglas foundry practice."





Turning AISI 1048 modified (hot-rolled) steel, Grade 350 increased tool life, cut downtime, lowered unit costs.

CARBOLOY ANNOUNCES NEW GRADE 350 CARBIDE FOR LIGHT ROUGHING, GENERAL FINISHING OF STEEL

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Built-In Tip Rigidity


A new, carefully controlled manufacturing process gives Grade 350 a unique grain structure and built-in structural rigidity. This rigidity enables Grade 350 to effectively resist the high temperatures

(around 1800° F.) encountered during high-speed machining . . . conditions which cause the cutting edges of other carbides to deform.

Two Steel-Cutting Grades Now Available

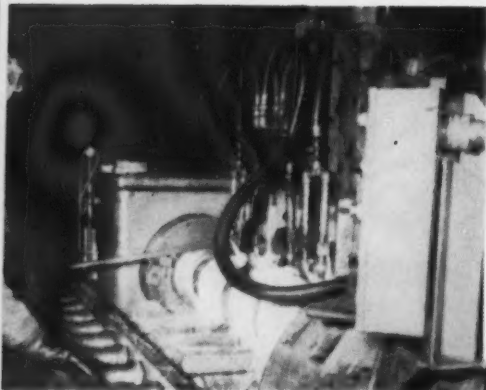
Grade 370 for heavy-duty steel cutting, introduced late in 1953, was the first of the new Carboly Series 300 carbides. Now Grade 350 extends the machining range of this new series to medium-duty steel cutting. Both grades are available immediately in a wide range of Standard Carboly Tools and blanks.

Typical in-plant case histories of these two new grades, with photos and operating data, are included on the following pages.



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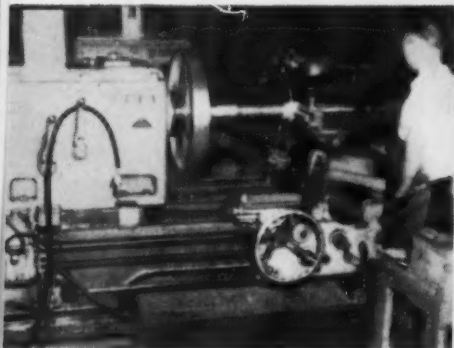
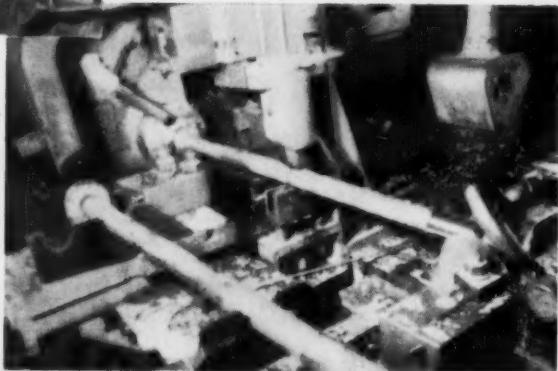


← **8-INCH STEEL SHELLS.** Grade 350 increased production runs on these forged and extruded shells between 15 and 20 pieces per grind. At toughest stage of rough-turning operation, Grade 350 processed 4 times as many shells as other carbides.

SETUP: Material—1045 steel with varying heat analysis. **Speed**—302 SFPM. **Feed**—0.044 inch. **Depth of cut**— $\frac{1}{16}$ to $\frac{1}{8}$ inch. **Coolant**—No.

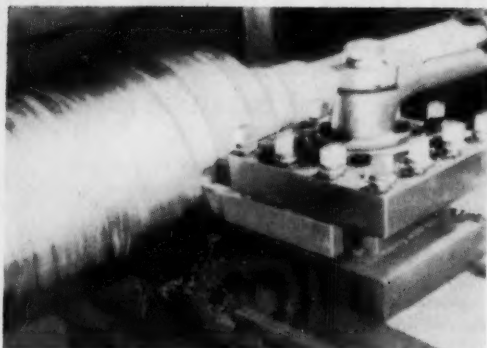
TRUCK AXLE FORGING. Turning with Grade 350 resulted in 33% more pieces per tool. Chipping and flaking, encountered with previously used tools, were eliminated.

SETUP: Material—AISI 4150 steel forging. **Speed**—200 SFPM on 2-inch diameter; 400 SFPM on 4-inch diameter. **Feed**—0.014 inch. **Depth of cut**— $\frac{1}{16}$ to $\frac{1}{8}$ inch. **Coolant**—Yes.



LANDING GEAR PISTON. Other carbides produced 2 parts per grind at 125 SFPM at Menasco Mfg. Co. Grade 350 increased speed to 185 SFPM. Production per grind went up 6 times; downtime was cut $\frac{1}{2}$ hour per shift.

SETUP: Material—4340 heat-treated forged steel. **Speed**—185 SFPM. **Feed**—0.010 inch. **Depth of cut**—0.060 to 0.200 inch. **Coolant**—Yes.



ELECTRIC MOTOR SHAFT. Carboloy Grade 350 increased the number of linear inches cut by 30% over other carbides used for roughing and finishing this large steel motor shaft.

SETUP: Material—AISI 1045 modified (hot-rolled). **Speed**—300 SFPM. **Feed**—0.020 inch. **Depth of cut**— $\frac{1}{16}$ to $\frac{1}{8}$ inch. **Coolant**—Yes.

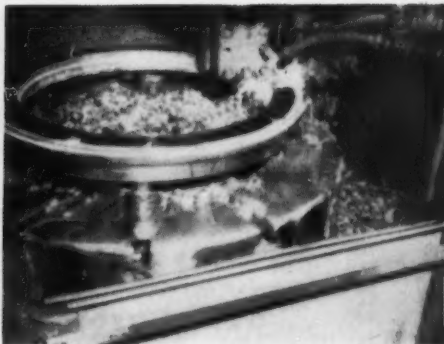
CARBOLOY GRADE 370 . . .

For heavy-duty steel cutting at higher speeds



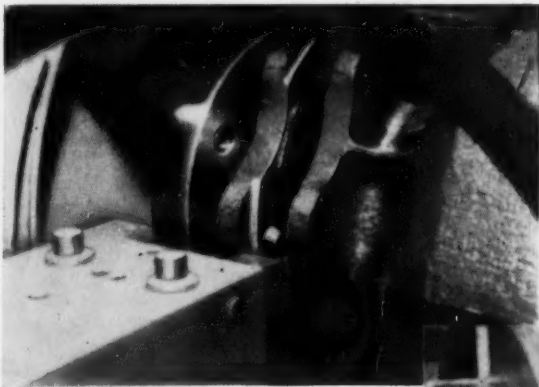
JET ENGINE TURBINE WHEEL SHAFT. A single Grade 370 tool now handles roughing and finishing at General Electric's Lynn River Works. Formerly, two tools were needed. Though operating at around 1700° F., Grade 370 increased tool life at least 40%.

SETUP: Material—4340 steel with Brinell hardness from 269 to 321. **Speed**—200 SFPM. **Feed**—0.018 inch. **Depth of cut**— $\frac{3}{8}$ to $\frac{3}{4}$ inch.



JET ENGINE TURBINE WHEEL RIMS. With Grade 370, G.E. got 300% increase in life of tools used for turning, boring and facing cold-worked Timken steel rims. Downtime was reduced two thirds and tool breakage drastically cut.

SETUP: Material—Cold-worked, forged Timken steel. **Speed**—160 SFPM on O.D.; 110 SFPM on I.D. **Feed**—0.010 inch. **Depth of cut**— $\frac{1}{4}$ to $\frac{3}{8}$ inch. **Coolant**—Yes.

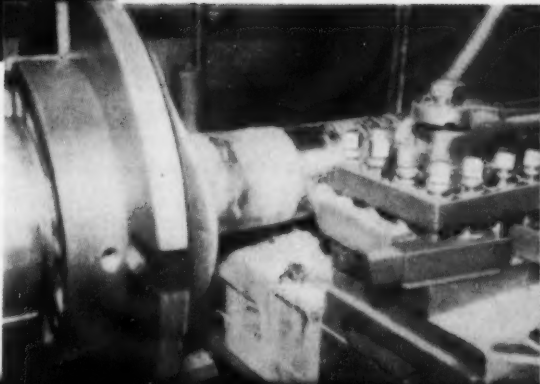


← **TRANSMISSION CASING** for fork lift truck. Machine downtime was sliced 50% and tool life extended almost 40% when Yale and Towne switched to Grade 370. Despite irregular steel casting, tool life on plunge facing operation increased 5 times with Grade 370.

SETUP: Material—Irregular cast steel with chilled spots and sand occlusions. **Speed**—318 SFPM. **Feed**—0.006 inch. **Depth of cut**— $\frac{3}{8}$ to $\frac{1}{2}$ inch. **Coolant**—No.

DRIVE ROLLER SHAFT. Use of Carboloy Grade 370 on this heavily scaled forging reduced machining time 25% at Thew Shovel Co., Lorain, Ohio. Tool life was increased almost 50% and cratering encountered with other tools was eliminated.

SETUP: Material—AISI 1035 hot-rolled forging. **Speed**—336 SFPM. **Feed**—0.025 inch. **Depth of cut**— $\frac{1}{2}$ inch.



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Discussion Questions For Safety Training

By ALFRED M. COOPER

The author explains some of the things that should be brought out in the discussion of typical safety discussion questions and also provides the administrator of such a program with suggestions that will help him in preparing additional questions.

IN a previous issue of this magazine the author outlined a method of industrial safety training in which the immediate supervisor of a group of workers conducted the safety discussions with his subordinates. Having administered successful programs of this type, and observed others, it occurs to me that some detailed consideration of what comes out of these discussions may be of value.

It will be remembered that the opening round of conferences in the series was devoted to a development, by the group, of the principal underlying causes of accidents in the particular department in which these people are employed. These discussions were held with all of the employees of a department, in groups of 20 to 30. Then the various lists of underlying causes were boiled down and a master list thus developed which could be used as an

outline for a course in safety training in that department.

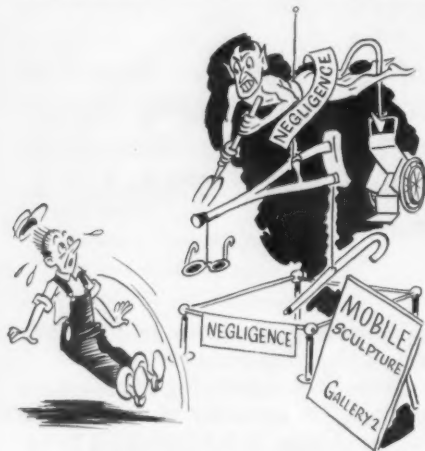
Since the underlying causes were arranged in an order of importance by the groups, it is reasonable to assume that the most urgent problems will thus be attacked first. I have found the considered opinions of



"Then the various lists of underlying causes were boiled down and a master list thus developed which could be used as an outline for a course in safety training in that department."

these workers surprisingly sound in such matters, providing only they have been given time to formulate their ideas.

However, the next step in this program calls for some nice work on the part of the administrator of the program — the safety engineer, the educational director, or whoever



"Not infrequently I have worked for eight hours to give three or four such questions exactly the proper balance and shades of meaning."

heads up the safety training. Before the program can proceed beyond the initial round of employee meetings this administrator must work up a number of good discussion questions built around the subject for the second round of meetings. For example, *negligence* is often chosen by the groups as the No. 1 underlying cause of accidents in their department, and it has been announced that the second round of meetings will be given over to a discussion of negligence as a cause of accidents.

Before these second-round meetings convene the administrator must

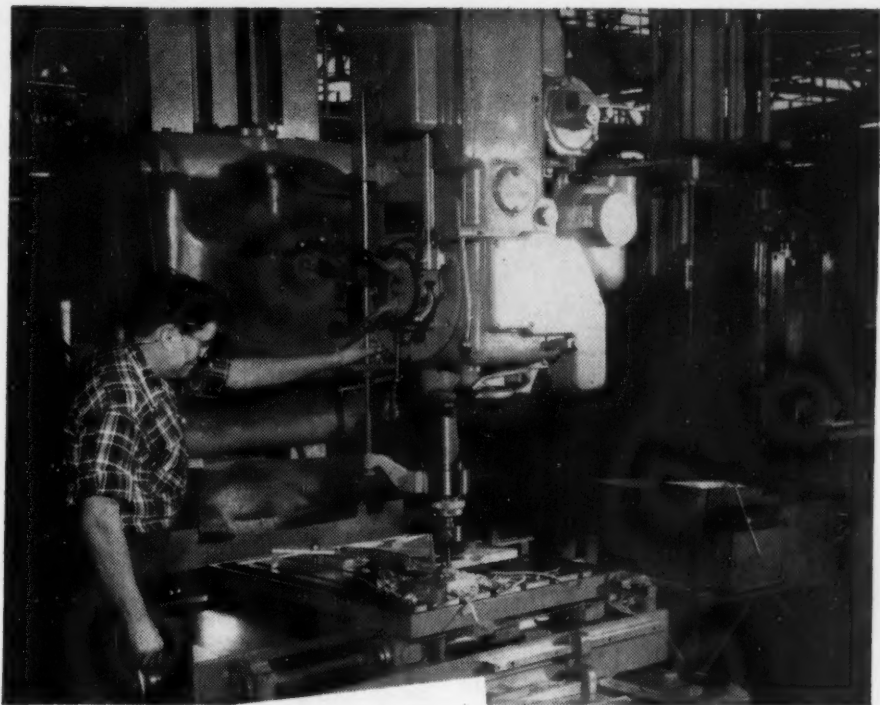
sweat out a number of good discussion questions to be used in each group from that department. Anyone who has had the responsibility for preparing such questions will understand what I mean by "sweat out." A sure-fire discussion question dealing, let us say, with negligence, is of imperative value in this type of training program. *Not infrequently I have worked for eight hours to give three or four such questions exactly the proper balance and shades of meaning.* When thus completed, a sure-fire discussion question will get results when used in any employee group in which the workers are engaged in hazardous occupations.

Let us consider a number of questions for discussion in safety conferences and see about what may reasonably be expected to come out of the discussion of these questions by an average group of such workers as are normally selected for safety training. For clarity we will consider them by subjects, such as negligence and speed or haste.

Negligence

Question: If an employee is habitually negligent of the safety of himself and others, what is the best way to cure him of this?

Here is a question for discussion that could result in a sharp drop in group interest if it were propounded as part of a lecture on safety. But I have never known this question to fail to develop real thought in a discussion group. That "and others" gives these people a chance to say what they think of workers who unnecessarily expose their fellows to hazards. Then there is an altruistic



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"Some of the suggested remedies offered by the workers will be found to be of an extremely harsh nature."

motivation implicit in the wording of the question.

It is not so important that the suggestions offered be the most practicable solutions to these first problems offered. The important thing is that these workers are going to think about these problems, for 20 minutes or so, harder than they ever have in their lives.

Some of the suggested remedies offered by the workers will be found to be of an extremely harsh nature. These people want to get real tough with an habitual offender in this matter of negligence. Firing him or her is the least drastic punishment they want to mete out. You gather they would much prefer to hang the careless one. Naturally you have no intention of putting any of these suggestions into effect. But how long can those in the group who are habitually negligent sit there and listen to what their fellows think of their actions without wondering if they cannot do something to improve their work habits? Granting that the guilty ones may be possessed of extremely thick hides, it is altogether

possible in such a discussion that some group member will name names and mention instances.

This treatment gives the offender a chance to defend himself, and considerably heightens the interest in the discussion. It must be remembered that a tame, sedate discussion accomplishes little. And by now the discussion we are considering cannot be described as sedate. It is quite likely to wax redhot.

Eventually the leader can begin to enumerate a number of solutions to the problem of the negligent worker as these are developed from the group, perhaps listing the best of these on the blackboard. This gives the group the feeling they are really accomplishing something — not just talking.

The main purpose behind the discussion of this opening question is, of course, that of getting the group to thinking about negligence as an underlying cause of accidents. When



"The main purpose behind the discussion of this opening question is, of course, that of getting the group to thinking about negligence as an underlying cause of accidents."



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this has been accomplished the group is ready for the second question.

Question: It is known that an employee neglects to use proper safeguards while working, but no accident occurs. In another case the employee neglects to use proper safeguards and causes a costly accident to equipment. Should there be any



"Only when the group participates actively in working out an acceptable conclusion has anything important been accomplished."

difference in the action of management in handling these two cases?

Now the group can really get down to business in discussing negligence. This is a concrete case and calls for a positive yes-or-no conclusion after exhaustive discussion.

It should be again mentioned, however, that the conclusions reached as group consensus are not nearly so important as the fact that each group member has found it necessary to *think* about negligence for another 20 minutes or so. Conceivably a particular worker may not open his mouth during the discussion. But if he is an interested listener he cannot help but think about the problem, and later on the results

of this thinking may well be manifested in his actions on the job. And this is all we can ask of any program of safety training—that it results in carry-over to the job.

Again, any safety lecturer can tell a group of workers what should be done in the case of either of the two alternatives propounded in the above question. And the results of such an exposition may well be nil. *Only when the group participates actively in working out an acceptable conclusion has anything important been accomplished.*

In general, groups tend to agree that, whether or not an accident occurs, negligence on the job should be punished. But this is by no means a universal opinion. If it was, the discussion question would not be worth a nickel, since genuine difference of opinion must exist before anything useful can come out of the discussion of any question.

Question: Under what circumstances is the supervisor responsible in case a subordinate is negligent? When is the supervisor not responsible?

This question could be discussed in a later meeting when the problem of improper supervision, as an underlying cause of accidents, is being considered. However, it also fits well into a discussion of negligence.

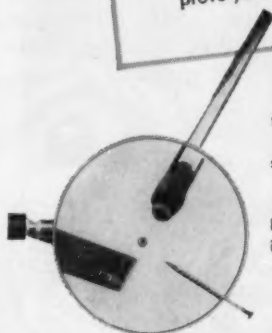
It will not be difficult for the group to think up instances in which they consider a supervisor should have been held responsible for accidents occurring in his department. But all the while the members are eyeing that second part of the question, and when the discussion leader finally calls attention to it he will



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"Since the immediate supervisor of these workers may well be leading this discussion, it will be seen that he is on something of a spot."

get some very interesting reactions.

The degree to which the average group may be able to differentiate intelligently between cases in which the supervisor is and is not responsible will be a revelation to anyone whose experience has been confined to telling the workers how to avoid accidents.

Since the immediate supervisor of these workers may well be leading this discussion, it will be seen that he is on something of a spot. But I have noted that the results obtained in this type of discussion are excellent. The supervisor must listen to criticism of himself. But thereafter, in discussing the second part of the question, the group must get the supervisor off the hook and put some of the blame on themselves.

Speed or Haste

This may well be the general subject for discussion at the second or third conference of a series. It affords unexcelled opportunity for thoughtful discussion and the forceful expression of ideas. The reason for this is that many workers (particularly those not on piecework)

sometimes complain that they are being encouraged by their supervisors to work faster than is safe. This may be an effort to pass the buck but whether or not the complaint is justified it is well to thresh out the whole matter of unwise speed. If this discussion is properly handled the inherent fairness of the workers soon manifests itself, and group consensus will reflect this fairness.

Question: What are some of the reasons why a man works so fast that he is an unsafe worker?

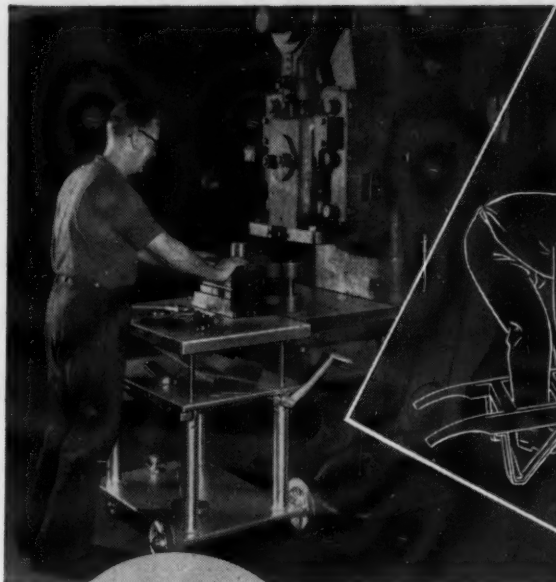
The wording of this question gives the group members a chance to say what they think about any supervisor they believe to be making them work faster than they consider safe. But since the question calls for "reasons," obviously the group must dig up more than just this one. And it is in the latter part of the discussion that most of the good is accomplished, so far as this question is concerned.



"The wording of this question gives the group members a chance to say what they think about any supervisor they believe to be making them work faster than they consider safe."

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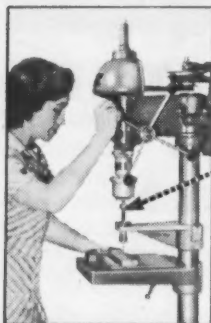
When the group moves on to other reasons than an over-zealous boss the members must give much thought to causes of excessive speed that emanate within the worker himself. By drawing out a number of such causes of haste the group can be made to do a lot of thinking about things they themselves can do to cut down on excessive speed.

In studying the conclusions that may be reached by any group in discussing a particular question it is necessary to speak of general agreements, since the actual discussion may vary sharply between groups in the same plant, but engaged in different types of work. But it should be emphasized that in any training conference there is nothing general

about the discussions. Rather, the members tend to cite specific cases, and thus the discussion remains always on the firm basis of practicality.

This is one of the criteria of any good safety discussion question. In its wording it must be broad enough to apply to many groups engaged in widely divergent activities. But within a couple of minutes after the discussion of such a question begins, the reactions deal solely with instances taken from the experiences of the workers in their own department. And, of course; this is

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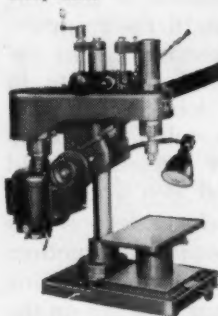
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exactly the sort of discussion that has the best chance of developing carry-over to the job.

Thus, the above question will develop different trends of discussion if presented to a group of overhead linemen than would be the case if the group was made up of lathe or punch press operators. Each group would talk in terms of the work with which it was familiar. But the theme would be the same, and the results



"The 'not enough speed' discussion serves to draw a line below which workers shall not go in attempting to use excessive speed as an excuse for not putting out a day's work."

obtained from the discussion would be equally satisfactory, no matter what line of work the group members were engaged in. This element of universality is one of the most encouraging facets of training employees through group discussion. You furnish the skeleton in the form of a properly worded discussion question and each group will put meat on its bones to its own taste.

Question: *How much speed is justifiable? (a) When is a man using too much speed in his work? (b) When is a man not using enough*

speed in his work?

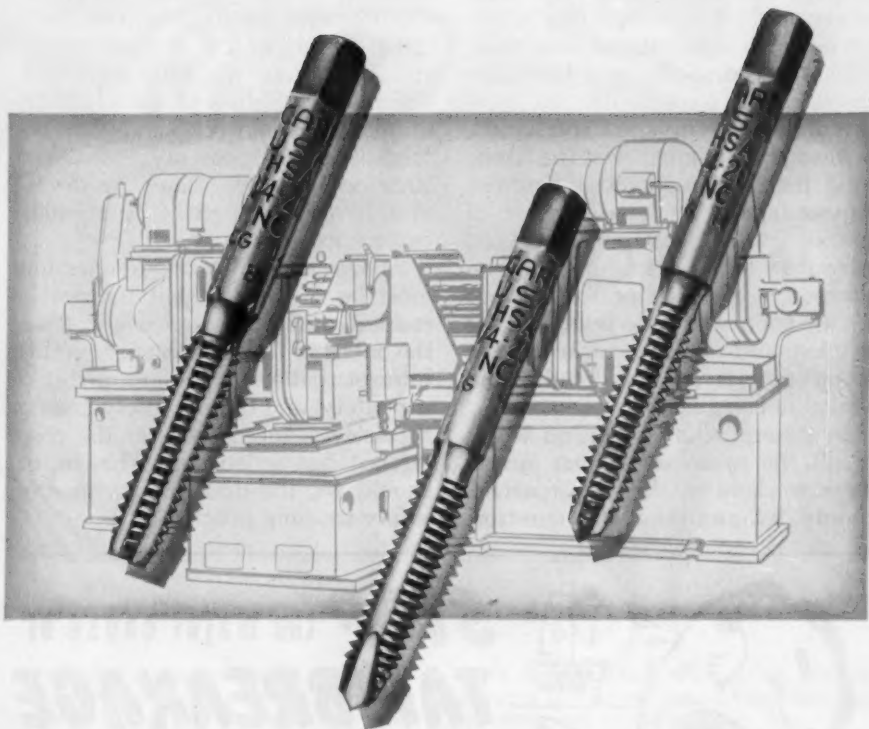
This question, of course, can only be discussed in an employee group in terms of specific jobs and situations. Thus, the reactions are of a consistently practical nature, applying directly to the work in the department in question.

The "too much speed" angle usually revolves around the hazards of working so fast that proper precautions cannot be taken. The "not enough speed" discussion serves to draw a line below which workers shall not go in attempting to use excessive speed as an excuse for not putting out a day's work. This latter discussion is needed at this point in order that employees will not use speed as an argument to support slow-down tendencies.

One fine group of industrial workers, the truck drivers, always advances an interesting reaction to the "too slow" thought. This group contends that slow drivers are more likely to cause accidents than are the speeders.

With any type of worker group, discussion of a question of this sort should continue until the members have reached consensus as to the "too fast" and "too slow" limits, in terms of specific jobs in their departments. At the end of the discussion each worker present should have a pretty good idea when he is working too fast for safety or too slow to get out adequate production.

Consideration of the foregoing discussion questions, bearing on the subjects of *negligence* and *haste*, should assist the head of a safety training program in building additional thought-provoking questions



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dealing with these or any other underlying causes of accidents. The success of this type of safety training depends primarily on how carefully these questions have been prepared, and, secondarily, on how well the conferences are conducted.

Always there must exist the likelihood that the question will arouse interest and a sharp difference of opinion in the group, particularly at the outset of the discussion. A good alternative question presenting two opposed concrete cases points up the problem and makes it easier for the group to arrive at a definite and workable conclusion.

In general this conclusion is not at all the same as anyone among these workers would have reached, simply by reading the question.

That is, the best solution to the problem stated in the question should never be too obvious. Anything leading in the phrasing of the question, or in the inflection with which it is delivered to a group, should be avoided. There are no "right" answers to any discussion question except as these are developed by the members of a particular conference group.

Above everything, the question must be so worded that interest is created and sustained, right from the outset of the discussion. It is this interest that keeps the group thinking safety, and talking safety among themselves, for days after the conference has adjourned. This is, or should be, the desideratum in any safety training program.



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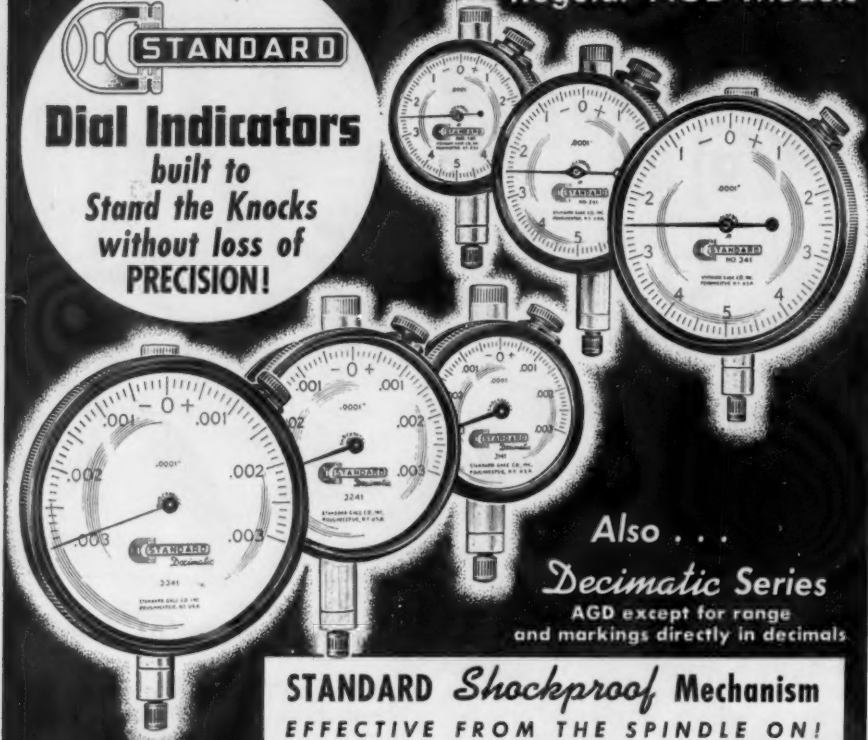
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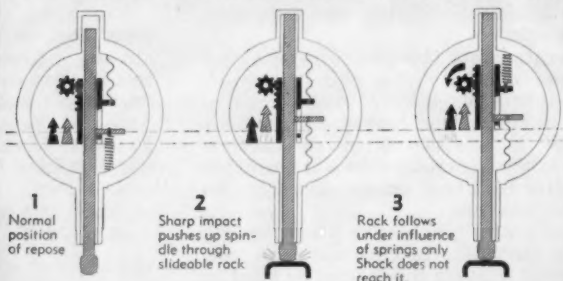
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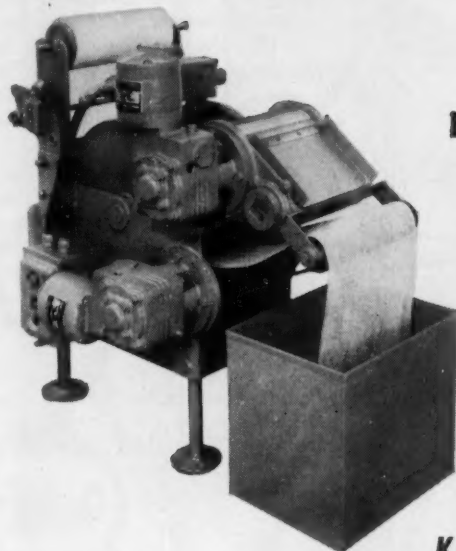
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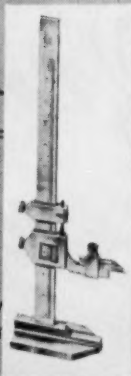


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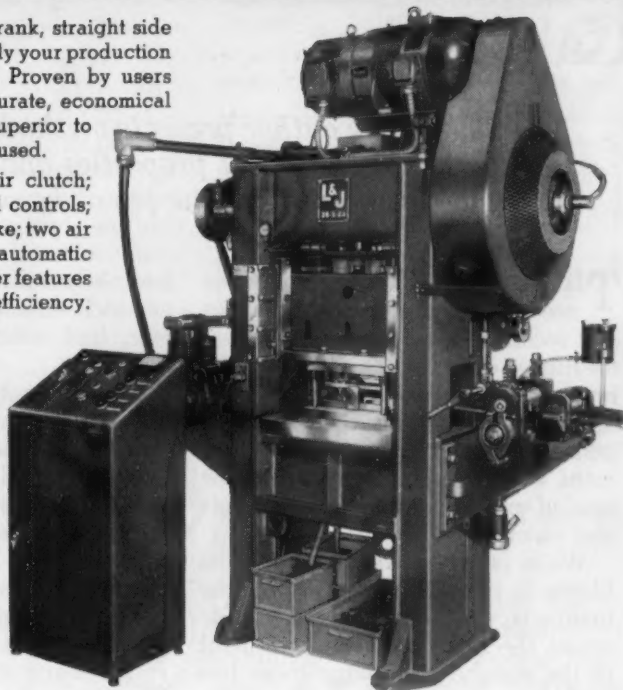
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Piercing Punch Calculation

By FEDERICO STRASSER

In which the author presents methods for determining whether the physical properties and dimensions of a punch are correct for the job at hand.

THE small, thin, piercing punches used both in progressive type dies and second-operation piercing (perforating) dies quite frequently break. The consequences of such breakage are not only the actual expenses for the making and replacement of new punches, but also the loss of production from idle tools and machines.

When punch breakage occurs, the blame is placed too readily on the inadequacy of the tool steel and/or on the improper heat treatment of the punches. Although these two causes are quite frequently at the actual root of the difficulty, in many cases it is the tool engineer who is responsible since, in the design of the punch, he may not have taken into considera-

tion the conditions of the case, such as stock characteristics, hole diameter, tool construction and design, and so on.

Small punches always should be checked by calculation in order to determine whether their physical properties and dimensions are correct for the task which they are called upon to perform; that is, if they are capable of withstanding the stresses imposed on them in service. The checking is done in two separate steps to determine (1) the compressive strength and (2) the buckling strength of the punch.

Compressive Strength Check

This check consists of finding out whether the compressive stress on the punch is less than the compressive strength of the material from which the punch is made. For this purpose, the following formula is employed:

$$K_1 \geq P \div A \text{ where } \dots\dots (1)$$

K_1 is the compressive strength of the material from which the punch is made in lb./sq. in.

P is the cutting (blanking or piercing) pressure in lb.

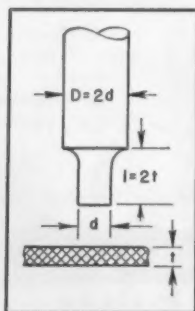


Fig. 1—Make a two-diameter punch with a thick body and a short cutting point of correct diameter.

A is the cross-sectional area of the punch in sq. in.

On the other hand, the cutting pressure is calculated by the universally known formula:

$$P = K_2 p t \text{ where } \dots\dots (2)$$

K_2 is the ultimate shearing strength of the stock in lb./sq. in.

p is the perimeter of cut in inches

t is the stock thickness in inches

In addition, since over 95 per cent of all the small holes that are pierced with punches for which such a check is to be made are round, we may substitute certain of the above mentioned values by their corresponding auxiliary formulas, as follows:

From formula (1)

$$A = \pi d^2 \div 4 \dots\dots\dots (3)$$

From formula (2)

$$p = \pi d \dots\dots\dots (4)$$

where d is the punch diameter in inches.

Consequently, formula (1) may be transformed thus:

$$K_1 \geq \frac{K_2 \pi d t}{\pi d^2 \div 4} \text{ or simplified } \dots\dots (5)$$

$$K_1 \geq 4 K_2 t \div d \dots\dots (6)$$

Therefore, if the punch is made from hardened tool steel with a compressive strength of cca. 270,000 p.s.i. (already including an ample safety factor), we have

$$270,000 \geq 4 K_2 t \div d \dots\dots (7)$$

$$270,000 \div 4 \geq K_2 t \div d \dots\dots (8)$$

$$d \div t \geq K_2 \div 67,500 \dots\dots (9)$$

From formula (9) results, we can conclude that:

(a) in the case of hard steel (ultimate shearing strength, 70,000 p.s.i.) $d \div t = 1.037 \div 1$; which means that the minimum diameter hole which can be punched is equal to stock thickness; (b) in the case of

soft steel ($K_2 = 55,000$ p.s.i.) $d \div t = 1 \div 1.225$; in other words, it is possible to punch a minimum size hole of approximately 20 per cent less diameter than stock thickness; and (c) in the case of copper ($K_2 = 28,000$ p.s.i.) $d \div t = 1 \div 2.41$; which means that the minimum punch diameter may be less than

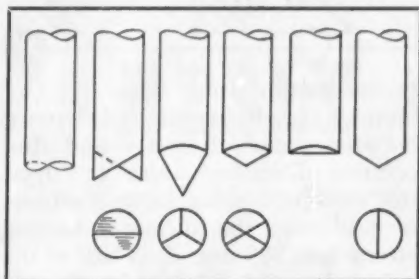


Fig. 2—Reduce the cutting pressure by providing the cutting point with a special form or shear.

half of the stock thickness (approximately 58 per cent less).

Remedies

If the smallest punchable hole diameter obtained with formula (9) should be still greater than the hole which must be pierced in a given stock, then any of the following remedies may be tried (in very severe cases, perhaps a combination of these remedies):

(1) Make a two-diameter punch (Fig. 1) with a thick body and a short cutting point of correct diameter. For best results, the body diameter should be approximately twice the hole diameter, and the length of the cutting point twice the stock thickness.

(2) Reduce the cutting pressure by one of the following methods:

(a) provide a special form or shear

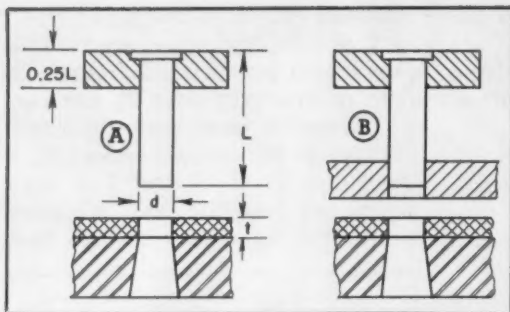


Fig. 3 — (A) For checking punch height, the universally known Formula II of Euler is employed. (B) Guide the punch in a slip-fit bushing placed in the stripper.

L is the total punch height in inches

On the other hand, the pressure P of formula (10) is the same as in formula (2), so we may write

$$K_2 d t = \frac{\pi^2 E \pi d^4}{64 L^2} \text{ or } \dots (11)$$

$$L^2 = \frac{32,000,000 \pi^2 d^3}{64 K_2 t}$$

or simplified (12)

$$L = \sqrt{\frac{4,950,000 d^3}{K_2 t}} \dots (13)$$

to the cutting point (Fig. 2); (b) increase punch clearance (difference between punch diameter and die-opening diameter); and (c) heat the stock; for example, in the case of mild steel, the ultimate shearing strength at 930 deg. F. is half of the cold value, and at 1,100 deg. F. one-fourth of it.

(3) Change the tool grade for the manufacture of the punch, selecting one of higher compressive strength.

Buckling Strength Check

The second calculation deals with the length (height) of the punch in general. The length should be made as short as permitted by the tool design. However, too short of punches present trouble in setting the die. Therefore, a reasonable length should be found that will assure safety and ease of setting.

For the checking of the punch height (see A, Fig. 3) the universally known Formula II of Euler is employed

$$P = \pi^2 EI \div L^2 \text{ where } \dots (10)$$

P is the maximum permissible load in lb.

E is the modulus of elasticity (for steel, 30,000,000, to 34,000,000)

I is the moment of inertia (for round punches, $I = \pi d^4 \div 64$)

In order to spare our readers the trouble of making a lot of complicated mathematical computations, we prepared the accompanying table where the values of L may be instantly found for the most common metals employed in presswork. The use of the table is quite easy. In the line of the kind of stock select the sheet thickness value. In the corresponding column take the value which belongs to the line of punch diameter. For example, when you have to pierce a 0.12-inch diameter hole in soft steel of 0.034-inch thickness, the value of L is 2.30 inches.

In the case of intermediate data, either interpolate or simply take the next higher

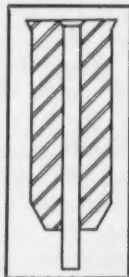


Fig. 4—Place the punch in a reinforcing quill made from hardened drill rod.

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aluminum	0.025	0.038	0.050	0.063	0.075	0.100	0.125	0.150	0.162	0.187	0.212	0.250	0.313	0.375
zinc														
copper	0.019	0.028	0.037	0.047	0.056	0.075	0.093	0.115	0.122	0.140	0.158	0.190	0.233	0.280
soft brass														
hard brass	0.011	0.017	0.023	0.029	0.034	0.046	0.057	0.068	0.074	0.085	0.100	0.120	0.140	0.170
mild steel														
hard steel	0.008	0.012	0.016	0.020	0.024	0.032	0.040	0.048	0.052	0.060	0.068	0.080	0.100	0.120
nickel														

Punch Diameter	Maximum Length of Punches													
0.02	0.27	0.22	0.19	0.17	0.16	0.14	—	—	—	—	—	—	—	—
0.04	0.77	0.63	0.54	0.49	0.44	0.38	0.34	0.32	0.30	0.24	0.25	0.24	0.22	0.20
0.06	1.41	1.15	1.00	0.90	0.81	0.71	0.63	0.57	0.55	0.51	0.48	0.45	0.40	0.36
0.08	2.18	1.77	1.53	1.37	1.27	1.08	0.97	0.89	0.85	0.79	0.74	0.69	0.61	0.56
0.10	3.04	2.47	2.14	1.90	1.75	1.52	1.36	1.23	1.19	1.10	1.04	0.96	0.85	0.78
0.12	4.00	3.25	2.80	2.52	2.30	2.00	1.78	1.63	1.56	1.46	1.37	1.26	1.13	1.03
0.16	—	—	4.33	3.87	3.54	3.06	2.74	2.50	2.40	2.23	2.10	1.93	.73	1.58
0.20	—	—	—	—	4.95	4.30	3.82	3.50	3.34	3.13	2.93	2.70	2.42	2.20
0.25	—	—	—	—	—	—	4.90	4.46	4.30	4.00	3.77	3.46	3.12	2.84
0.30	—	—	—	—	—	—	—	—	—	—	—	4.95	4.45	4.05

value of stock thickness and lower value of punch diameter. For instance, where we have a nickel sheet of 0.018-inch thickness and punch diameter of 0.14 inch, the simplest way is to take the values of 0.20-inch thickness and 0.12-inch punch diameter. To these data corresponds the maximum punch length of 2.52 inches.

Other Remedies

It happens sometimes that the maximum permissible punch height (found by means of the Table or formula 13) is less than the value which should be given to the punch, for reasons of the die design. In such cases, one may refer to any of

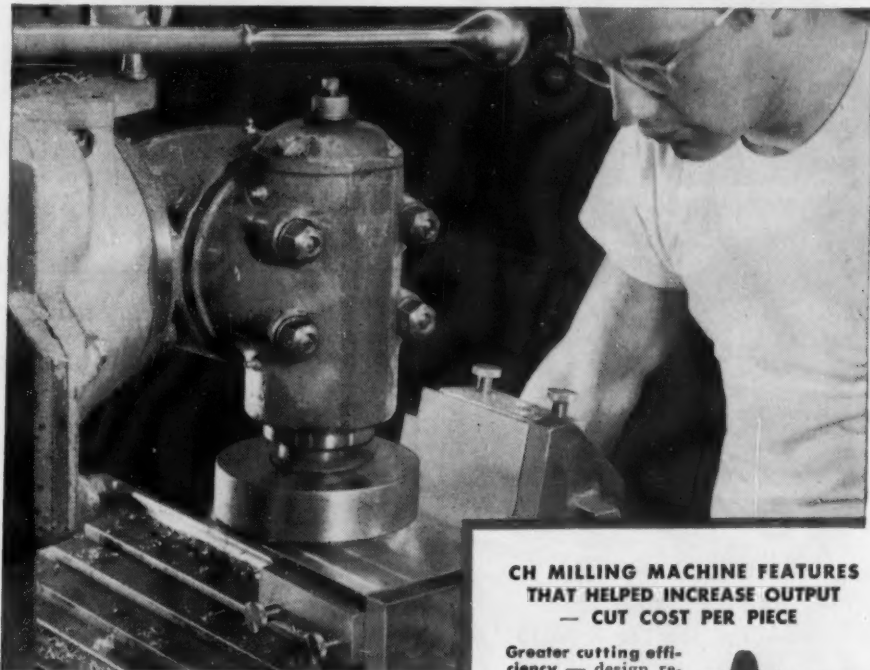
the remedies 1 to 3 given above for obviating the difficulties caused by compressive stress (because the same remedies also reduce the buckling stress) and, in addition, to the following ones:

(4) Guide the punch in a slip-fit bushing, placed in the stripper (*B*, Fig. 3). In such a case, for *L* the Formula III of Euler is employed:

$$P = 2 \pi^2 EI \div L^2 \dots (14)$$

As may be seen, the difference between formulas (14) and (10) is the figure "2" which means that in case of guided punches, the values given in the punch-length table may be increased by 41 per cent ($\sqrt{2} = 1.41$).

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Speeds fabrication of aircraft parts from 75ST aluminum alloy

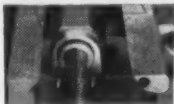
HERE ARE THE FACTS ON THIS JOB:

Location: - Mar Vista Engineering Co., Los Angeles, Calif.
Machine: - 5 hp, No. 2, Model CH, Plain Style used with Universal Milling Attachment.
Part: - Aircraft fitting for horizontal stabilizer.
Material: - 75ST aluminum alloy.
Cutter: - One blade - 8" fly cutter.
Cutter Speed: - 875 rpm. 9 ipm feed.
Depth of Cut: - .050".
Production: - 12 pieces per hour - all sides milled.

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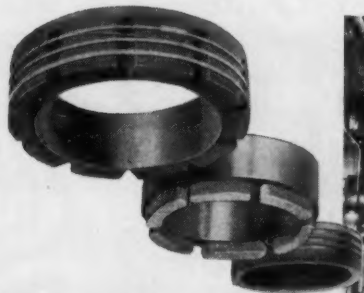
(5) Place the punch in a reinforcing quill made from hardened drill rod (Fig. 4). It is good practice to use such quills whenever the punch diameter is less than 1.5 times stock thickness in the case of stock whose ultimate shearing strength is more than 40,000 p.s.i., and whenever the punch diameter is less than stock thickness for stock whose ultimate shearing strength is less than 40,000 p.s.i.

6) Change the design of the tool so that a short punch may be employed.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.



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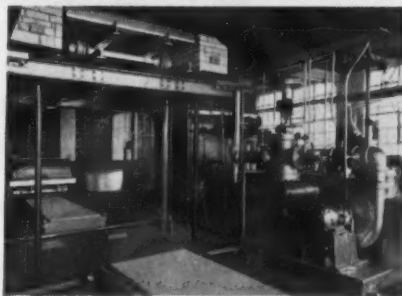
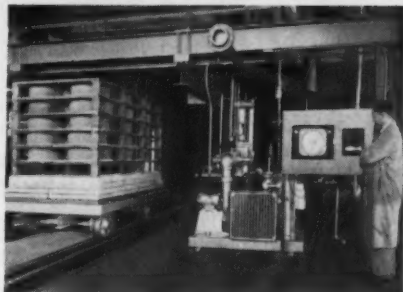
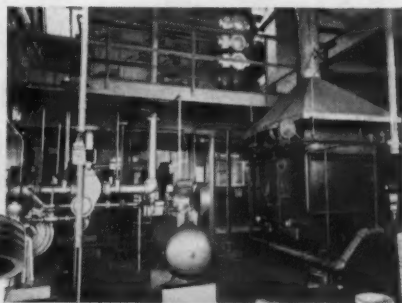
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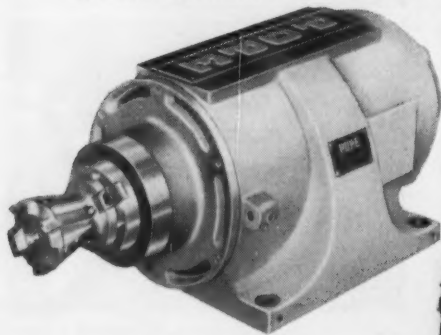
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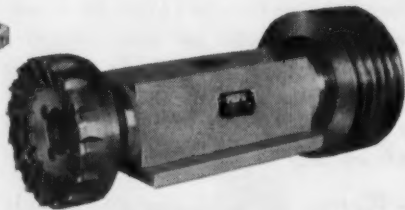
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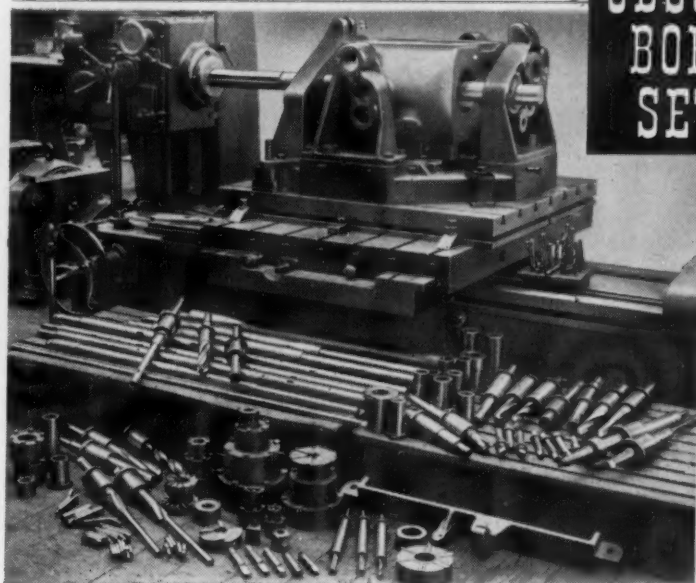
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Here is a picture of an ...

OBSOLETE BORING SETUP!



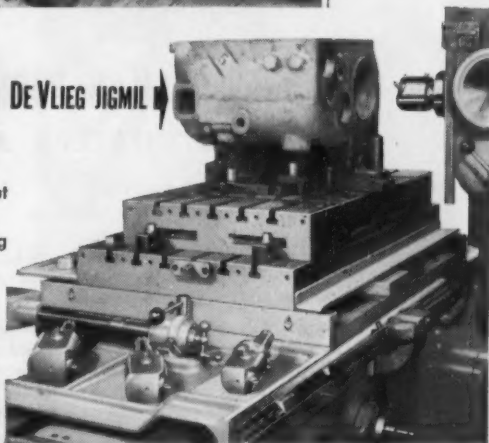
THIS PICTURE—
taken in
a well known
machine tool plant
illustrates
the old method
of boring
turret lathe
headstocks with
a costly inflexible
box jig and
a mass of
special tooling

The Modern Method

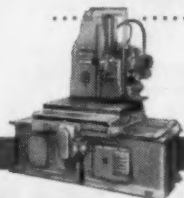
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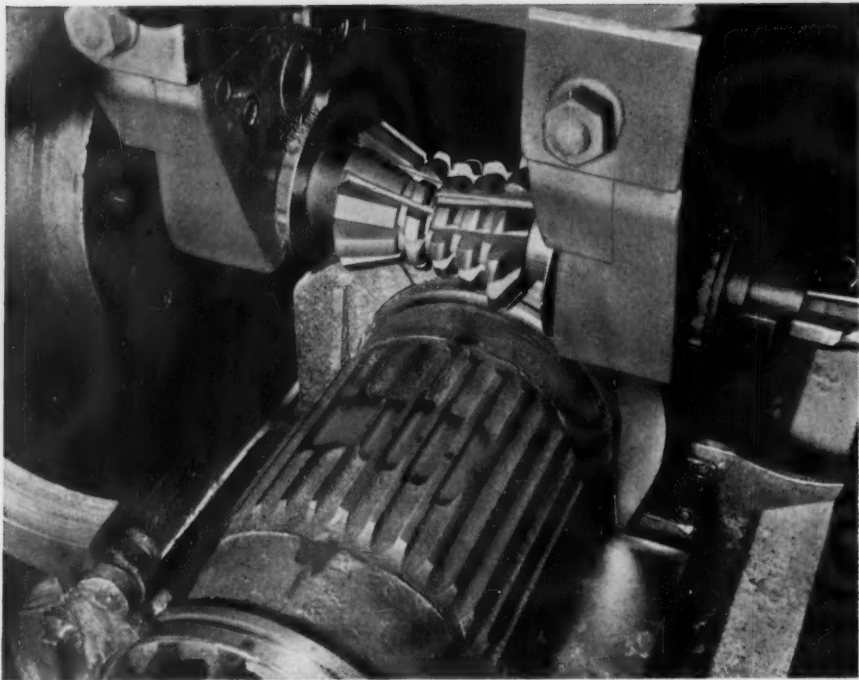


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BARBER-COLMAN FORM CUTTER DESIGN LESSENS CHATTER AND VIBRATION

Helical Teeth Provide Continuous Cutting Action

Shearing action of these Barber-Colman helical-fluted form cutters not only reduces chatter and vibration to a minimum, but also improves tool life and production on this milling job.

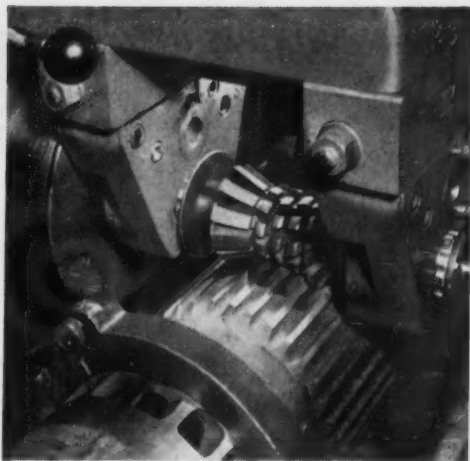
Gang-type cutters are recommended because they combine several operations in a single cut, and also because individual sections are interchangeable for other gang operations. Due to the type of cut and non-uniform material, some sections receive more wear than others and require more frequent replacement. With the gang arrangement, section replacements can be ordered singly, thereby reducing tooling costs.

Redesign of the cutters for this job included the adoption of helical teeth recommended by Barber-Colman Engineers. These helical teeth provide continuous cutting action and have eliminated chatter in the cut.

B U I L D E R S O F P R E C I S I O N G E A R

GOOD TOOL LIFE IN NON-UNIFORM MATERIAL

These cylinder liners are milled on two surfaces, 180° apart, using a feed of $\frac{3}{4}$ " per minute and cutter speed of 123 RPM. Cutters are $4\frac{1}{2}$ " diameter x 5.477" overall length, with helical teeth, and are fed radially to depth. The cast-steel liners are non-uniform in structure, and frequent hard spots are encountered. Production is 5 sleeves per hour compared with 2 per hour obtained with former straight-fluted cutters. Tool life averages 35-50 pieces per sharpening, depending upon the consistency of the material. There is no evidence of chatter or rapid wear as experienced with straight-fluted cutters.



EXTRA QUALITY AT NO EXTRA COST

Barber-Colman form-relieved cutters are checked within close tolerances for true concentricity and accurate index throughout each manufacturing step. This quality control requires extra operations and closer manufacturing inspection. No extra charge is made for this accuracy since Barber-Colman Engineers want to be sure that the proper degree of accuracy is present in all form cutters.

As a result of this accuracy, Barber-Colman form-relieved cutters do not require cylindrical grinding and "spot sharpening" in order to properly recondition them. They are simply and easily face-sharpened on any sharpening machine having controlled indexing. Consequently, they have low maintenance costs.

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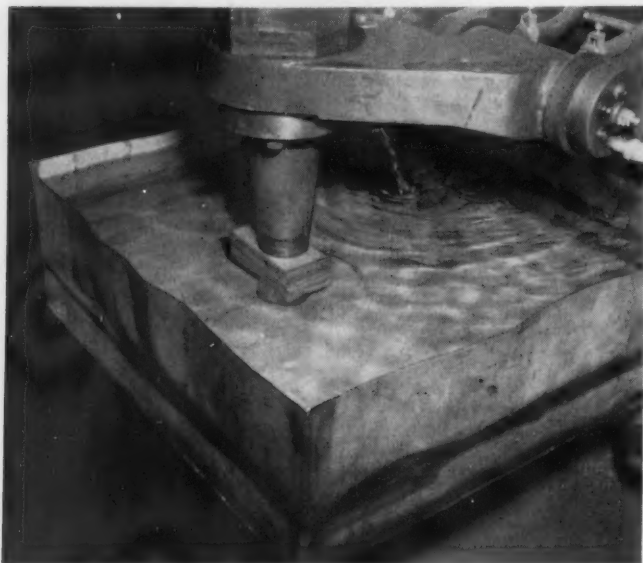
New Process of Resistance Welding in Liquid Conserves Scrap Titanium

This article discusses a new process of resistance spot welding in solution developed by The Glenn L. Martin Company which makes possible the utilization of virtually all scrap sheet titanium generated by the plant.

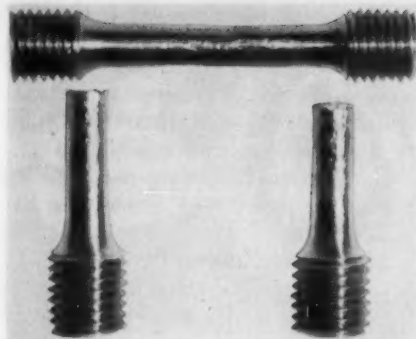
A NEW development of The Glenn L. Martin Company now makes possible the utilization of virtually all of the scrap sheet titanium generated by the plant. By resistance spot welding a thick stack

of these sheets submerged in liquid, a solid ingot of virgin metal is formed which has been found to be at least as strong as the parent metal. This ingot can then be machined into scarce hardware or aircraft parts.

The Martin process is basically unchanged from the normal method of



Close-up view of the liquid coolant tank constructed by The Glenn L. Martin Company to develop the new resistance spot welding process. Visible is the lower electrode in the bottom of the tank, a stack of sheet stainless steel and the upper electrode. Through the use of this liquid coolant, it is now possible to weld sheets of steel in thicknesses up to 3 in. and titanium in thicknesses up to 6 inches.



Shown herewith is a test bar machined from a weld nugget formed in the new Martin-developed process of resistance spot welding in solution. Mechanical properties are as follows: tensile strength, 92,000 p.s.i.; yield strength (.2% offset), 73,700 p.s.i.; elongation in 1.75 in., 17 per cent; reduction of area, 24 per cent.

resistance welding. By adding a tank to the machine in which the two electrodes and the material to be welded meet in liquid, it was discovered that the capacity of the machine could be increased up to six-fold. In the past, when metal was stacked more than an inch thick, it would seriously oxidize and become so hot as to cause metal expulsion and warpage. By performing the welding cycle under the cooling effect of a liquid, the thickness of the weldable laminate has been increased to 6 in. for titanium and 3 in. for stainless steel. Research is presently underway to increase these figures.

The applications of the new process are many. Perhaps one of the major applications centers about the utilization of scrap titanium sheets generated in the manufacture of aircraft parts from this scarce material. Because titanium costs up to twenty dollars a pound and sells as scrap for one dollar a pound, it is obvious that great savings will be achieved.

By the Martin process, it is possible to resistance weld this scrap in stacks up to 6 in. thick. The nugget formed by the weld can then be machined into titanium hardware and aircraft parts. The scarcity of titanium hardware today and its high cost are well known.

Martin engineers foresee the day when they will be able to produce long ingots by this process utilizing resistance seam welding in liquid. These long ingots could be machined into wing spars or similar items. Another application that seems possible today would be in heavy bomber wings that are made of thick rolled metal. Rather than pay for a



Shown are 89 sheets of titanium that have been resistance spot welded in solution to form a solid stack 6 in. thick.

whole sheet of specially rolled material that is later machined at a great cost in time and money to the correct taper, many sheets of titanium could possibly be welded together to form step laminates roughly approaching the taper required. These could then be machined to exact taper in much less time than previously required.

Martin engineers can see the day when it will be possible to form whole wings by this process. The wing skins will be laminated and machined. These will then be welded to the formers and spars and the major assemblies then welded together in such a way as to form the whole wing.

Martin engineers further state

that an item such as today's highly complex turbine wheel with its myriad blades can, in the foreseeable future, be fabricated as one integral unit by the Martin resistance welding process. Using titanium, many sheets of this metal, previously cut to shape, would be stacked up to form a solid center with the many blades protruding therefrom. When welded, a complete wheel and blades will be formed which could be machined to the desired tolerance.

In the field of tool engineering lies still other applications for this new development. In the fabrication of

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Table I

	PARENT MATERIAL AMS 4901 Ti sheet RC 70,000	WELDED TEST PIECE
Tensile Strength	80,000 p.s.i. min.	92,000 p.s.i.
Yield Strength	70,000 p.s.i. min.	73,700 p.s.i.
Elongation	15 per cent min.	17 per cent

Table showing comparison between the minimum specifications for the parent material and the results obtained with the Martin nugget.

built-up tools that are presently machined from bar stock, great savings in time and money, it is believed, would be realized through resistance spot welding laminated sections in varying thicknesses.

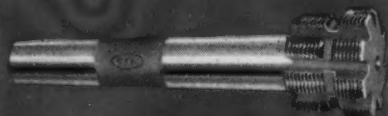
The actual mechanics of the Martin process are very simple. In one case, 85 sheets of 0.064-in. titanium, with two sheets of 0.092-in. titanium on the top and bottom, were resistance spot welded in liquid. Briefly, the procedure was as follows: The sheets were deoxidized in an aqueous solution of 2 per cent hydrofluoric acid and 10 per cent nitric acid. A 400 kva. Sciaky three-phase welding machine was used with Mallory 3 electrodes, 2½ in. in diameter and with a radius of approximately 20 inches. The cooling tank was 24 x 24 x 8 inches. The bottom electrode protruded into the bottom of the tank and the top electrode was just submerged in the liquid. The control settings to produce the 6-in. laminate were: weld, 69 per cent; weld vernier, 43 per cent; pressure, constant high 19,500 lb.; weld heat, 6 cycles; cool time, 2 cycles; and weld time, 15 seconds on multiple impulses.

To test the strength of the laminate formed, Martin laboratories were supplied with a standard A.S.

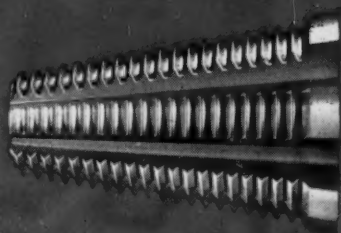
from the nugget. Table I shows a comparison between the minimum specifications for the parent material and the results obtained with the Martin nugget.

This method of resistance welding in liquid, it is claimed, will find a growing use as progress continues in the design and production of aircraft assemblies. Today, Martin is able to weld titanium in thicknesses up to 6 in. and stainless steel up to 3 inches. This, say Martin engineers, is just the beginning.





Ground shank type thread milling cutter for threading two diameters at the same time.



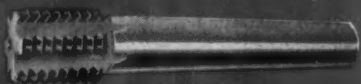
Tapered, shell type multiple thread milling cutter.



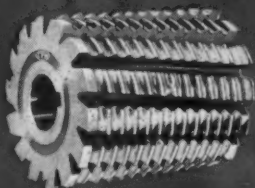
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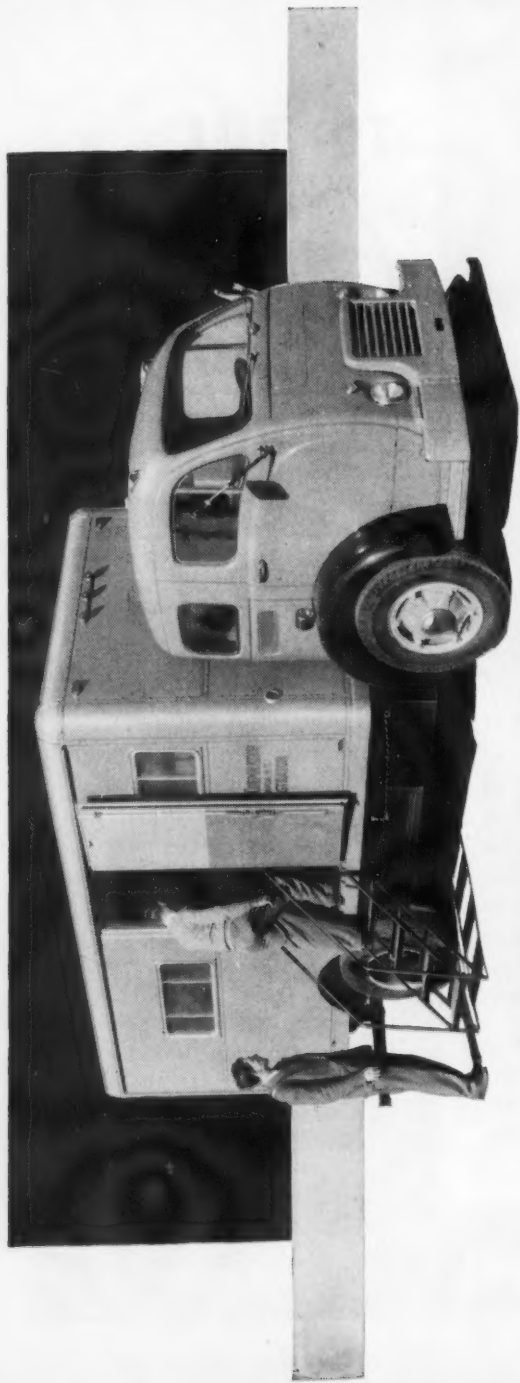


Shell type multiple thread milling cutter for machining a special radius form.

53-15

Continental Tool Works

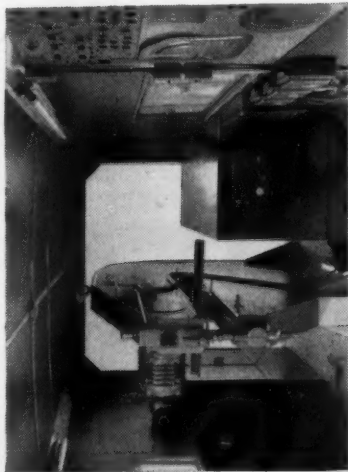
DIVISION OF EX-CELL-O CORPORATION
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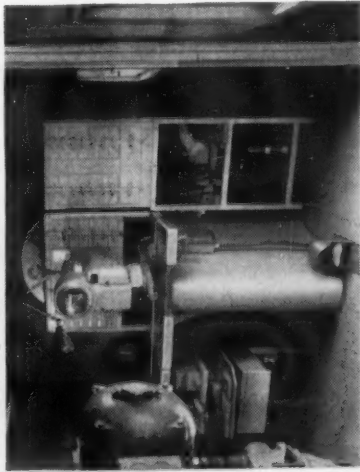
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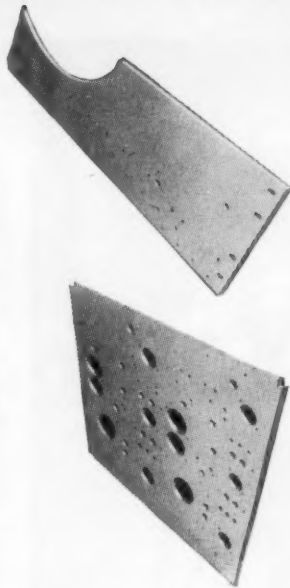
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A part of a piece of farm equipment 72½" x 22" with 32 holes and nibbled cut-out was finished including setup in only 12.01 minutes, subsequent pieces in only . . . **2.32 MIN.**

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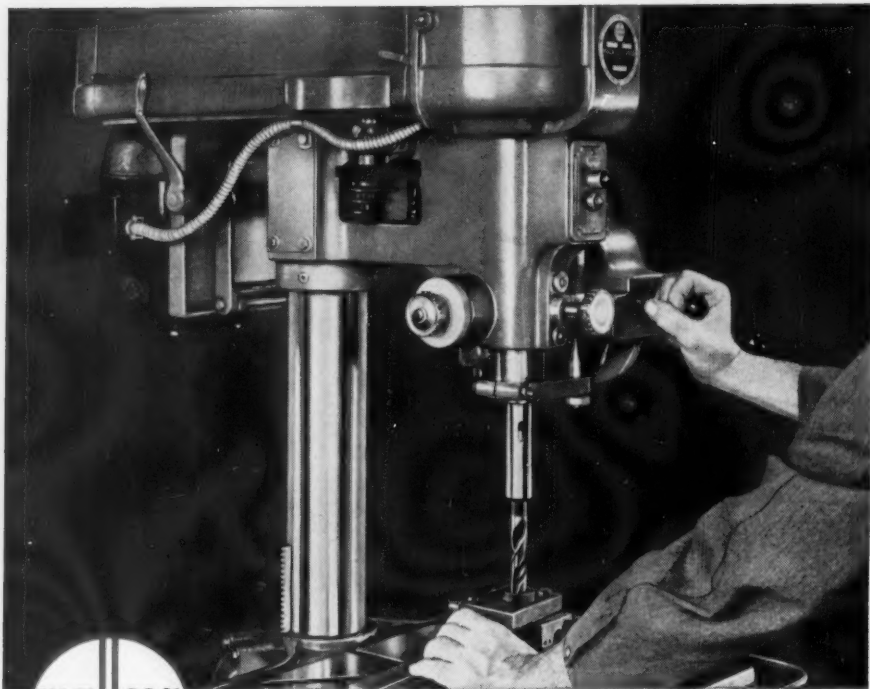
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How National Supply "Guards" Against Grinding Hazards

By GALE WHITACRE*

In the Tool Grinding Section at the Torrance plant of National Supply, the author states that there has not been a disabling injury in more than ten years, due to the close observance of safety rules.

PLANT safety is largely a matter of recognizing where potential dangers exist, and guarding against them. This means endeavoring to

* Supervisor, Tool Grinding, The National Supply Co., Torrance, Calif.

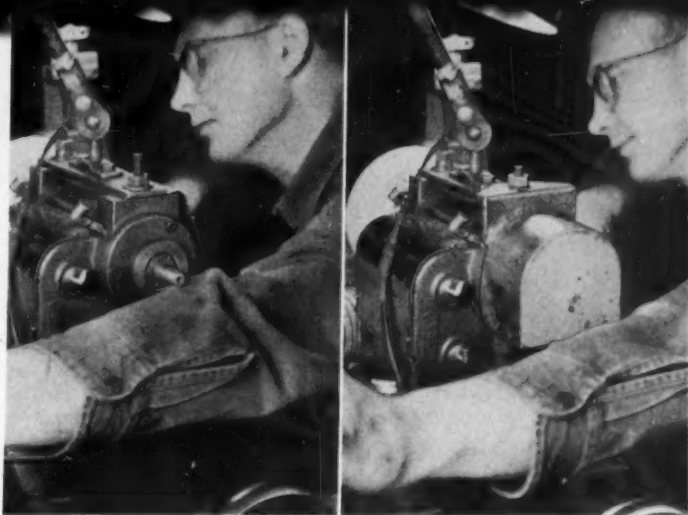
guard against the rare, "once in a million," types of accidents as well as against obvious dangers.

Everybody recognizes that a rotating saw, or a rotating grinding wheel, can be dangerous. The

Safety is a "must" in the Tool Grinding Section of The National Supply Company plant at Torrance, California, as shown in this illustration. Note the uncluttered aisles, clean equipment and workbenches, and the excellent illumination. A concave metal shield, painted in a light color, stands before each machine at which there is an exposed grinding wheel. Nozzles of the dust collection system carry dust from the grinding operations to the master exhaust pipes overhead.



A lessen in safety is illustrated in these "before and after" views. The exposed spindle of the grinding machine in the "before" view is apt to catch the sleeve of the operator and throw him against the grinding wheel. In the "after" view, a simple housing for the spindle end eliminates the possibility of such injury.



phrase, "never monkey with the buzz saw," has come into widespread use. But it is less customary to think of a rotating spindle as a possible cause of accidents. Yet an innocent-looking spindle may be the means of catching a man's sleeve and throwing him against the saw or wheel at the opposite end. A number of serious accidents have been caused in that manner.

We are proud that in the Tool Grinding Section at the Torrance plant of The National Supply Company there has not been a disabling injury in more than ten years. We hope to extend that record for many more years.

Our plant is a large and complex one; it is described as the largest completely integrated machinery manufacturing plant in the West. A large amount of machine tooling is performed, requiring the use of a wide variety of grinding tools and machines. So we face a big problem in operating the tool service departments safely and efficiently.

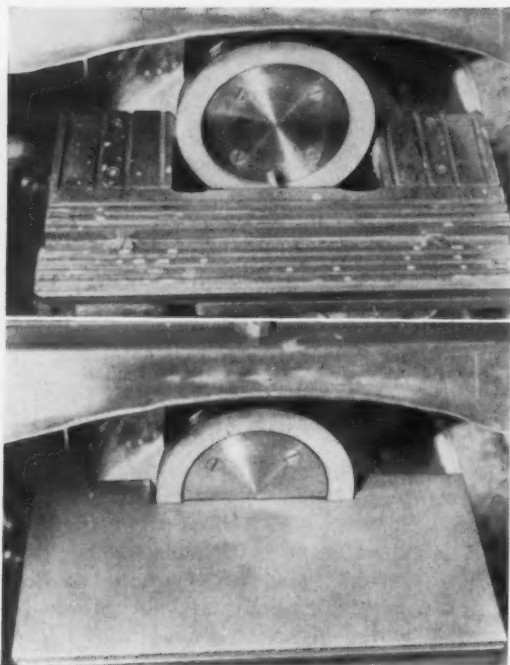
Visitors to our plant are high in their praise of the layout of the Tool Grinding Section and of the meas-

ures observed in accordance with the plant's policy, "Safety Is a Must." A large, well-lighted and well-ventilated area is provided. The floor layout provides adequate working space for each man, and allows for wide, uncluttered aisleways. Equipment and workbenches are kept clean. Adequate facilities for materials handling are provided. Safety rules are enforced.

One of the features that surprises visitors is the lack of dust, considering the number of grinding machines in operation. A nozzle at each machine, resembling that of a vacuum cleaner, picks up the dust. These nozzles lead to a master exhaust system that carries off the dust, keeping the air in the section clean and healthful.

At each machine on which there is an exposed grinding wheel, a metal plate, about 2 ft. by 3 ft. and of a concave shape, serves as a shield. These shields are painted a light color to reflect light near the point of operation.

A simple housing encloses each



Two steps in making a grinding wheel safer are illustrated in these views. The top view shows the use of a hardened steel plate, conforming to the recess of the wheel, to fill up that recess. It is attached with four screws, 1/32 in. below the face of the wheel. The bottom view illustrates the addition of a secondary table rest to fit closely around the wheel, covering holes in the original rest through which a tool might accidentally be dipped.

four screws, 1/32 in. below the face of the wheel. A secondary table rest, that fits closely around the abrasive wheel, covers up openings through which a cutting tool might accidentally be dipped.

Operators are required to wear goggles at all times when operating machinery, and other well known and generally accepted safety

practices are followed. One of the signs posted in the Tool Grinding Section says "Be Safe, Be Healthy, Be Happy." We think this is a good slogan, and feel that the simple, effective ideas we have adopted, and our close observance of safety rules, have contributed to our outstanding record of safety.

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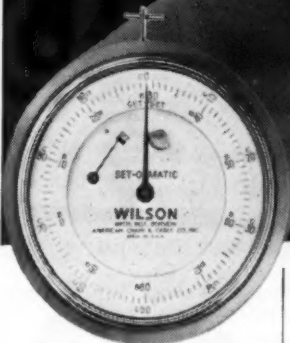
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NEW YORK 3, N. Y.



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New Motorized
WILSON "ROCKWELL"*
Hardness Tester with
SET-O-MATIC* Gauge



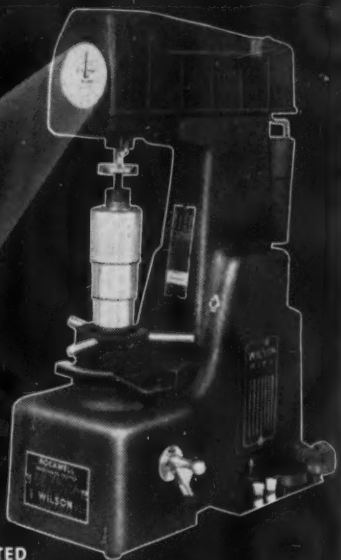
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The Model Y Motorized WILSON "ROCKWELL" Hardness Tester is in production and orders are being accepted for early delivery. Write today for literature and prices.

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AMERICAN CHAIN & CABLE

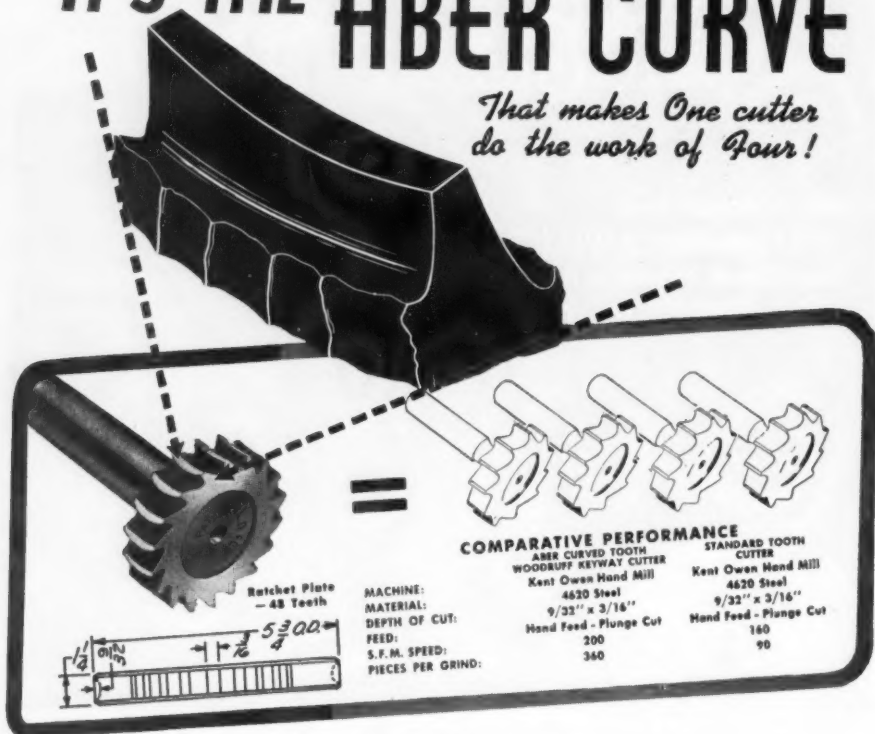
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*Trade Marks



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ABER CURVED TOOTH WOODRUFF KEYWAY CUTTER	STANDARD TOOTH CUTTER
Kent Owen Hand Mill	Kent Owen Hand Mill
4620 Steel	4620 Steel
9/32" x 3/16"	9/32" x 3/16"
Hand Feed - Plunge Cut	Hand Feed - Plunge Cut
200	160
360	90

MACHINE:
MATERIAL:
DEPTH OF CUT:
FEED:
S. F. M. SPEED:
PIECES PER GRIND:

Ratchet Plate - 48 Teeth

5 3/4" 0.002"

Yes, in an actual test in a large pipe threading company's shop, ONE Aber Curved Tooth Woodruff Keyway cutter performed the work ordinarily requiring FOUR cutters of standard tooth design. This 400% increase in cutter performance is by no means unusual, for Aber's exclusive curved tooth design permits a smoother finish, absence of chatter, greatly increased cutter life, and cuts more freely with far less hand pressure from the operator. In addition, it proved to be a tremendous saver of "down" time, and reduced costs in the cutter grind room.



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ENGINEERING WORKS INC.
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- ★ **UNIQUE—VERSATILE.** Nothing else like it. One or several machines can be the answer to some of your production problems.

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information.**

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50 YEARS OF SERVICE TO INDUSTRY

Case History No. 16

Machining Stainless Steel

By G. J. STEVENS*

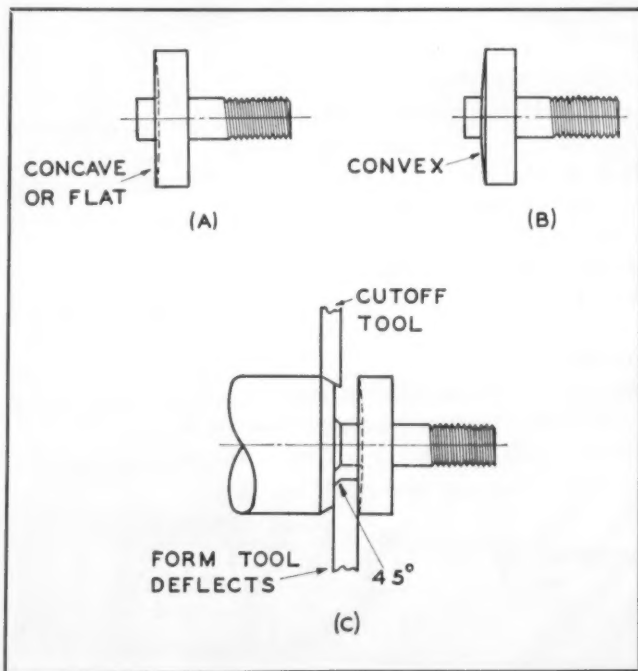
Problem: A threaded stud made from 1-in. o.d. Type 416 stainless steel on a turret lathe was required to have a slightly concaved or flat surface as shown in drawing A.

However, when the part was formed with a narrow form tool before the cutoff, a slightly convex shoulder was obtained, as shown in drawing B. This was probably due to end play in the spindle bearings, which, of course, was undesirable when the

part was subsequently placed in a particular assembly.

Solution: A small 45-degree angle was ground on the form tool, which caused the tool to exert pressure on the shoulder of the part. This produced the slightly concaved surface as shown in drawing C. The size of the 45-degree flat which is ground on the form tool determines the amount of deflection which is obtained.

* Machining Engineer, Armco Steel Corp.

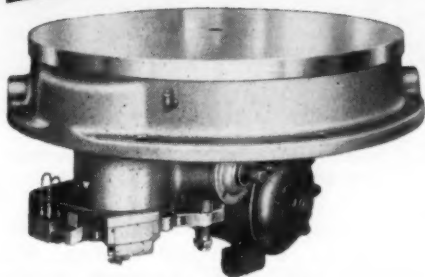


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Made in two sizes—No. 1 and No. 2
Morse Taper.

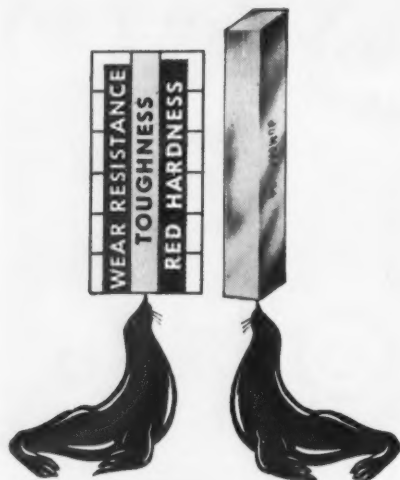
This simple unit gives high production at a lower cost. When used in multiples to complete operations, no relocation of part is necessary, thus producing more accurate work.

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Cincinnati 1, Ohio

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Important Meeting Dates

June 6-9

American Gear Manufacturers Association, Annual Meeting, The Homestead, Hot Springs, Virginia. Association headquarters: One Thomas Circle, Washington 5, D. C.

June 9-11

American Society for Quality Control, Eighth Annual Convention, Jefferson Hotel, St. Louis, Missouri. Society headquarters: Room 5036, 70 East 45th Street, New York 17, N. Y.

June 11

Cutting Tool Manufacturers Association, Summer Meeting. Association headquarters: 416 Penobscot Building, Detroit, Michigan.

June 13-18

American Society for Testing Materials, Annual Meeting and Exhibit, Hotels Sherman and Morrison, Chicago. Society headquarters: 1916 Race St., Philadelphia 3, Pennsylvania.

June 20-23

National Metal Trades Association, 9th Annual Plant Management Conference, French Lick, Indiana. Association headquarters: Chicago, Illinois.

June 20-24

American Society of Mechanical Engineers, Semi-Annual Meeting, William Penn Hotel, Pittsburgh. Society headquarters: 29 W. 39th St., New York City, New York.

June 21-25

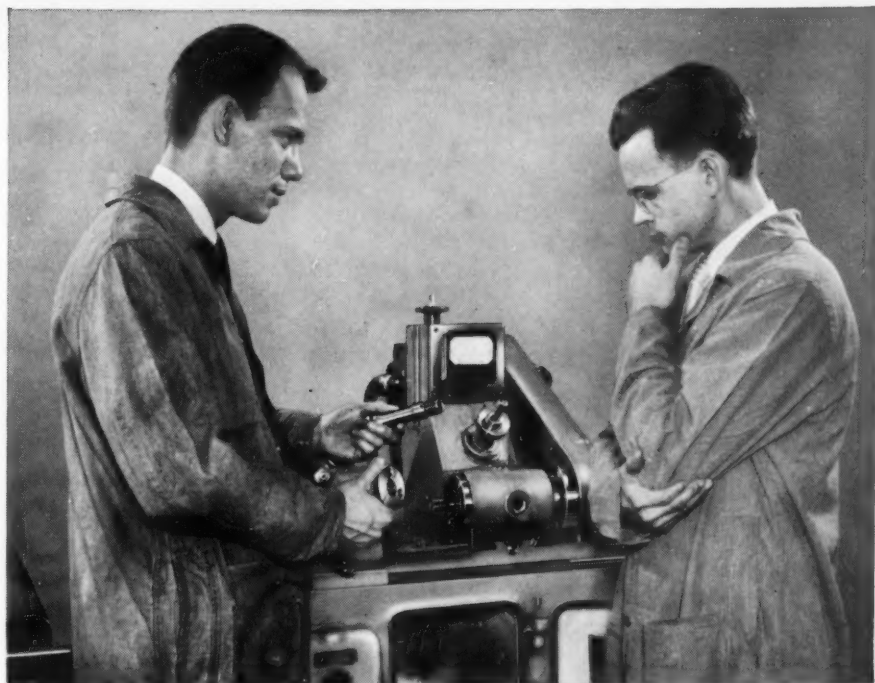
American Institute of Electrical Engineers, Summer General and Pacific General Meeting, Hotel Biltmore, Los Angeles. Institute headquarters: 33 W. 39th St., New York 18, New York.

July 12-15

American Electroplater Annual Convention, Hotel Statler, New York. Society headquarters, 445 Broad St., Newark 2, New Jersey.

July 13-15

Western Plant Maintenance Show and Conference, Pan Pacific Auditorium, Los Angeles, California.



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"That's the kind of performance you get when you call on Hanson-Whitney to solve your threading problems."

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Threading Processes
Offer Complete
Co-ordinated
Responsibility
For
The Machine Tools
The Cutting Tools
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The BD is the preferred hub-type wheel for heavier stock removal. Ideal for smoothing and blending welds on fabricated work; smoothing flame-cut edges and

stainless steel welds; cleaning between teeth of gear castings; many slotting, notching and cutting-off operations.

4 Great Team-Mates for your "TOUCH of GOLD"

*Norton REINFORCED WHEELS add value, cut costs,
on hundreds of grinding jobs*

Here's the Line-Up

BD Rigid hub-type, resinoid bonded. Glass cloth reinforcement for high strength, plus the Nylon layer add up to extra hub-wheel safety. For the more severe jobs on your right angle grinders.

BFR Semi-flexible hub-type, resinoid bonded. Cotton fabric reinforcement with the additional layer of Nylon. For better finish and contour blending.

BF Semi-flexible straight wheel, resinoid bonded. Cotton fabric construction similar to the BFR, but without Nylon reinforcement. For periphery grinding only. An excellent deburring and finishing wheel. Also available in mounted wheels and points and in hand sticks.

BN Straight wheel, resinoid bonded. Glass cloth reinforcement, in the BD. Provides very high resistance to breakage in a wide range of cutting-off and other jobs.

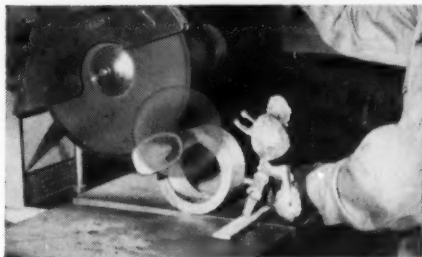
Add outstanding versatility to strength and to safety, multiply the result by four and you have one reason why this Norton team rates as the "Big 4" among reinforced wheels.

Separately, each handles a considerable number of important grinding jobs. Together, they cover an almost endless list of applications, ranging from light deburring to severe cutting-off. And they do every one of these jobs with the *extra* safety, service life and economy that add the real "Touch of Gold" to your grinding operations.

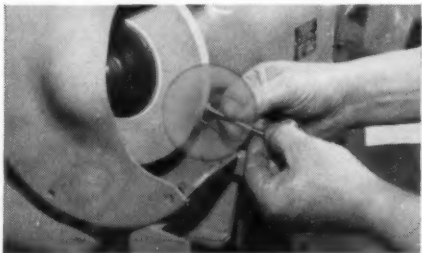
Your Norton Distributor

will be glad to demonstrate Norton Reinforced Wheels in your shop, and to aid you in any grinding problem. Or write to NORTON COMPANY, Worcester 6, Mass. for the Brand New Catalog on Reinforced Wheels. Distributors in all principal cities, listed under "Grinding Wheels" in your classified phone directory. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass. W-1552

The BFR is outstanding for light snagging, light weld grinding, smooth finishing, blending contours and corners, removing mold marks, removing rust and scale, and scarfing and beveling before welding. Also for notching gates and risers.



The BN is the recommended cut-off wheel wherever great strength and safety are vital. Excels at cutting-off non-ferrous gates and risers and various non-metals. Its range also includes cutting wire rope, slotting rails, tuck pointing, etc. Small sizes are popular on small portable grinders.



The BF Semi-Flexible, a straight wheel version of the BFR, is the wheel to use for light deburring, breaking edges on machined work, taking off flash from plastic parts, removing light welds and many other miscellaneous light portable and bench grinding applications.

NORTON ABRASIVES

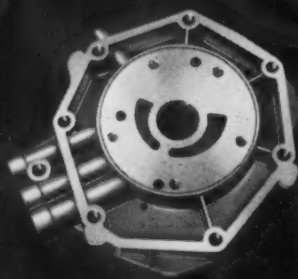
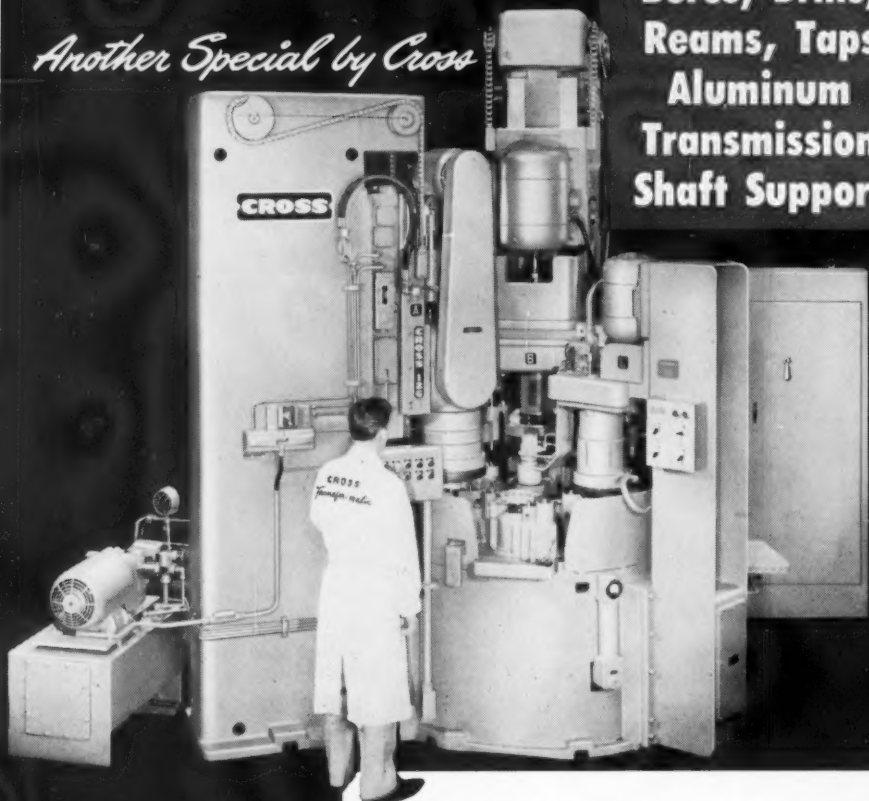
*Making better products...
to make other products better*



BF Mounted Wheels and Points, like all Norton mounted wheels and points, are trued on their own spindles. Having the same laminated construction as the larger BF wheels, they are designed for such jobs as finishing plastic molds, glass molds, forging dies, etc. For hand finishing, use BF sticks.

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- ★ Turns rear face and counterbores large pilot diameter, drills 6 holes, drills and reams 2 locating holes, chamfers and taps 5 holes.
- ★ 128 aluminum castings per hour at 100% efficiency.
- ★ 6 station fluid motor driven index table with 1 loading and 5 working stations.
- ★ Hydraulic power clamping for work holding fixtures.
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- ★ Other features: Hydraulic feed and rapid traverse; hardened and ground ways; filtered coolant system; construction to J.I.C. standards; automatic work cycle.

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modern equipment at work

Production of Thermometer Rod Stems Increased with Pneumatic Bar Feed

TAYLOR Instrument Companies of Rochester, New York, manufacturer of precision instruments for industry and home, recently introduced a new addition to its consumer line of cooking thermometers—a hermetically sealed dial roast meat thermometer having a pointed, stainless steel stem

which, inserted into a roast, accurately indicates internal meat temperature, or “degree of doneness,” on a large, easy to read dial. As part of its production plans, the company assigned to its screw machine department the goal of producing 5,000 thermometer stems a day. One automatic screw machine, part of a regular machine battery, was set aside to cut off and burr 4 and $\frac{3}{4}$ -inch lengths of $\frac{1}{4}$ -inch stainless steel tubing from

lengths 10 and 12 feet long. This particular screw machine is equipped with a Model 68 Lipe automatic magazine loading bar feed to feed the stock through the machine collet to the



Stems for hermetically sealed dial roast meat thermometers of the type shown in the inset are produced at Taylor Instrument at the rate of 267 per hour using the pneumatic bar feed equipped automatic screw machine illustrated.

stock stop. Simple to operate, the Lipe AML is actuated by air valves and cylinders. Bar stock or tubing is racked in a magazine along one side of a split stock bar tube, the lower half of which slides backward to receive the bottom bar stock from the magazine. Then, the lower half of the stock bar tube, carrying the bar, moves forward to close the stock bar tube. A stock pusher, inside this tube, moves the bar into the spindle and collet of the automatic screw machine.

Once loaded, the action of the bar feed is completely automatic. The stock bar is fed into the stock tube pusher. When the stock bar is used up to the end remnant, the machine clutch disengages and the machine tool cycle stops with the spindle revolving and the collet open. Then, the automatic screw machine clutch disengagement stops the indexing cycle of the machine, thereby allowing the AML bar stock pusher to readily retract as required.

By releasing one stock bar from the magazine and by dropping it into the lower half of the stock bar tube, a new stock bar is loaded. The bar

feed stock pusher feeds the new bar through the collet and ejects the end remnant. Immediately after the new stock bar is positioned for the first cut-off operation, the automatic screw machine clutch is engaged automatically, the collet grips the stock bar and the screw machine again is in full cycle operation. The new stock bar has been fed out just far enough by the stock pusher for the cut-off tool to square the bar with a minimum waste

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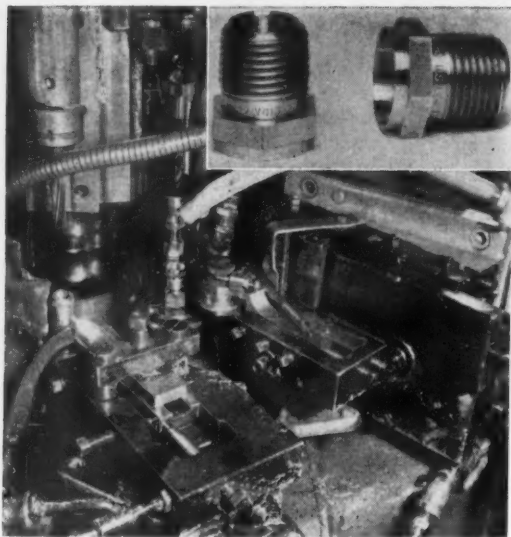
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A complete line of Circular Carbide-Tipped Tools, Expansion Reamers—Special Tools



A New Method Model 500-C automatic roll marker installed on a 1¼-in. six-spindle Acme-Gridley screw machine has marked over two million parts during the machine cycle. The 500-C marker is shown at Station 4 in retracted position, having completed marking the part now at the cut-off station (lower center). Inset shows automotive couplings marked with 21-character impression during the cycle of the automatic screw machine.

of stock. Thereafter, indexing operating cycles continue until the stock bar is used up completely.

With the automatic bar feed, the automatic screw machine produces 267 stem rods an hour—a production increase over the previously used feed method of 24 per cent.

Over Two Million Screw Machine Parts Marked with Single Automatic Roll Marker

THE automatic marking of over two million parts with a 21-character impression has been accomplished in the plant of Berlew Products, Inc., by employing a single standard Model 500-C automatic roll marker manufactured by New Method Steel Stamps. For three years the lone marking unit has operated on a 1¼-in. Acme-Gridley tooled for the job, as shown in the accompanying illustration.

The first 100,000 parts were of different design and were produced from screw machine steel. An additional 400,000 parts of various designs were turned from brass, using different New Method roll dies for the part numbers, trade marks, and so on. The last 1½ million parts (of the type shown in the inset) were machined from 15/16-in. hexagonal brass bar stock and were marked with a single roll die which is still in continuous use. Use of an offset roll die permitted marking within 3/64-in. of the hex cut-off.

Screw machine operations which are performed in producing the couplings shown are: Station 6, rough forming; Station 1, finish forming; Station 2, shaving; 3, thread rolling; Station 4, automatic marking and drilling; and Station 5, reaming and cut-off.

Although the marking unit is capable of operation at much higher speeds, spindle speed is held at 1400 r.p.m. (290 s.f.m.) to avoid excessive vibration of the machine resulting from the use of hexagonal bar stock. Marking one part every six seconds, the automatic marking unit has been in operation for a period equal to nearly 14 months of continuous operation, 8 hours per day and every day of the month.



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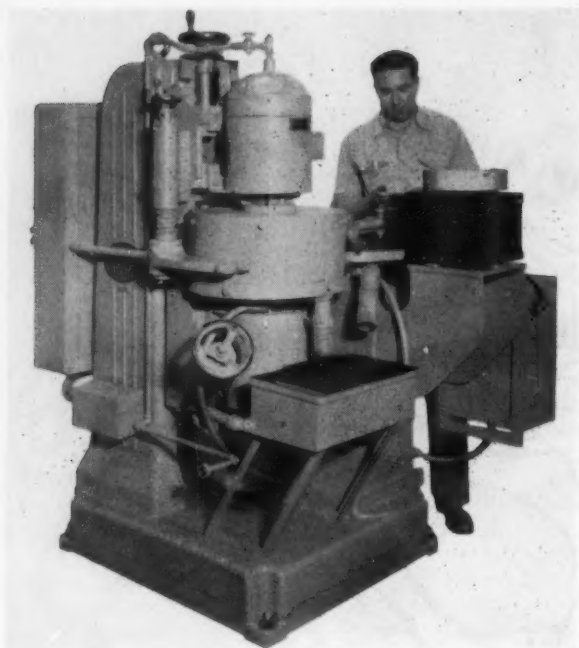
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Name and Title

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Address

State



Besly No. 905 grinder automatically finishes two parallel faces of oil pump eccentric rings in one pass. Rings are dumped into grinder feed hopper at right, ground automatically, and fall into small bin (center, foreground).

Grinding Oil Pump Eccentric Rings

SOME 1200 to 1400 oil pump eccentric rings per hour are ground on the two parallel faces on the Besly No. 905 18-inch double vertical spindle grinder shown herewith. Except for loading and emptying hoppers, the entire operation of the grinder is automatic. The rings are hopper fed into a

continuously rotating feed wheel which in turn carries the parts between two abrasive wheels. Both faces of the rings are ground simultaneously, removing a maximum of 0.009 inch of stock. Accuracy is held to 0.002 inch for size and 0.0003 inch for flatness and parallelism. After grinding is completed, the rings are unloaded by gravity into a discharge pan.

A special safety mechanism has been incorporated in the fixture to assure proper loading of the eccentric rings. Should a part fail to enter the feed wheel properly, a radially mounted arm releases a limit switch and breaks the electrical circuit to the fixture drive motor. Grinding is done wet with coolant conducted directly into the grinding zone through the upper motor spindle. A non-magnetic cool-

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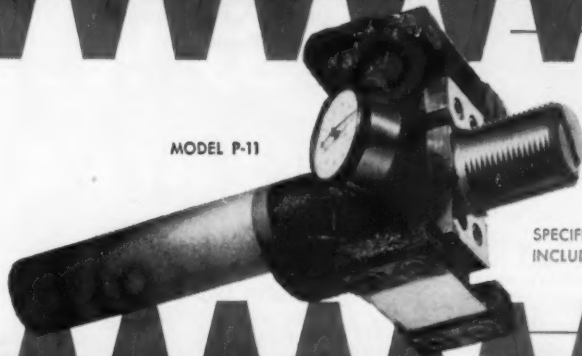
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AT TEN TIMES THE SPEED
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The P-11 gives a single dial indicator reading in .0005", of variation from basic size of P.D., form and lead. Interchangeable segments inspect all classes of threads from 5/16" to 5" dia. Pressure on the thumb lever collapses the pair of segments allowing swift engagement of the threads. This 14 oz. portable gage is designed for use in the shop or at the inspection bench. Descriptive literature on this and other Bryant gages is available on request. Send coupon today.

Bench type gages for external or internal threads are available, with or without squareness-of-face attachment.



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CHUCKING GRINDER CO.
Springfield, Vermont, U. S. A.

MAIL THE COUPON TODAY!

BRYANT CHUCKING GRINDER CO., SPRINGFIELD, VT.

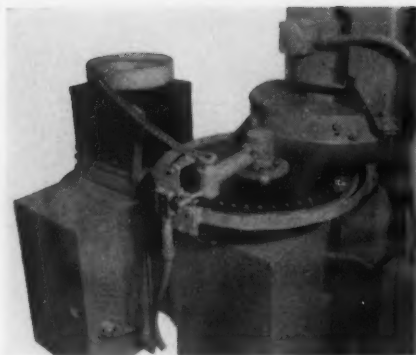
Please send me illustrated folders giving full information on the Bryant Portable and Bench Thread Gages.
MMS

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Close-up view of grinder showing how eccentric rings are automatically loaded from hopper into rotary wheel which revolves between two abrasive discs

ant filter is used with the grinder for this application although magnetic separators can also be used.

Cemented Carbides Overcome Difficulties in Machining Abrasive Die Casting

AT Master Machinery Builders, Detroit, where a highly abrasive aluminum-bronze die casting was being produced, one big problem that faced the company was how to produce this complex part for the control assembly of a medium tank without ruining tools to the point of no return. Another problem was that of producing finishes to within 30 micro-inches.

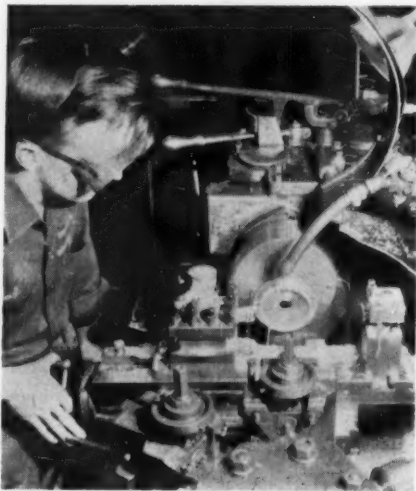
Both problems were solved through the use of cemented carbides. With carbides, tool life is said to have increased 2,400 times. Over 200 parts are produced per tool grind. And to date, nearly 3,000 parts have been completed without a single reject. The cemented carbide involved is Carboloy grade 78B, brazed to standard tools made by the Carboloy Department of General Electric Company.

The job is highly specialized. Com-

plete machining of a single part, for example, requires about 7 hours. The work is done on a Warner & Swasey No. 3 turret lathe, and involves the use of special jigs and fixtures to handle a sequence of 40 operations such as turning, facing, boring, chamfering and reaming. Eight of these operations are performed with a standard Carboloy single-point tool. The first operation, for example, is an outside diameter turning job involving a single-point tool. This is followed up with boring and reaming requiring the use of a special jig. The turning operation, incidentally, is run at 560 s.f.m. as are the subsequent facing operations, a couple of which involve two tools facing both sides of the work simultaneously.

In the entire operation, Master Machinery makes use of two jigs and new turret mounts after the initial 14 operations.

This view taken in the plant of Master Machinery Builders, Detroit, shows how a grade 78B carbide cutting tool is employed in the first operation—machining the outside diameter—on a highly abrasive aluminum-bronze die casting. After finishing this surface, the operator sets his indicator and other operations are measured from this first cut.

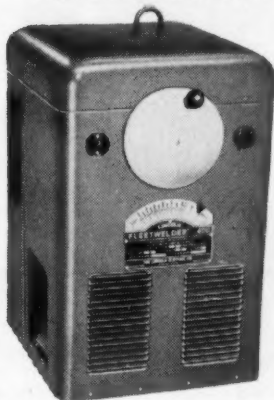


CHECK LINCOLN'S NEW LOW PRICES

before you buy any AC welder

FLEETWELDER

... prices reduced 11% to 24%



◀ Fleetwelder AC with Arc-Booster. 300, 400, 500 amp sizes. For wide range of light and heavy welding with AC.

FLEETWELDER SPECIAL

... new low-priced AC welder



▶ Fleetwelder Special. 300, 400, 500 amp sizes. More useable amps per dollar than any AC welder.

LOWEST COST AC WELDING

Lincoln's new combination of lower AC machine prices and faster welding with Jetweld heralds another development in Lincoln's program to lower welding costs.

The highest manual AC welding speeds ever attained are now available to industry ... and at lowest possible cost because:

1. Lincoln AC machine prices are lowered 11% to 24% ... and more with the new Fleetwelder Special.

2. 35% and higher welding speeds can now be realized with Jetwelding ... using the cost-cutting combination of Jetweld and Lincoln AC power.

WRITE FOR PRICES

— Benefit Now. Have your Lincoln representative check your requirements for both electrodes and welders. Call or write.

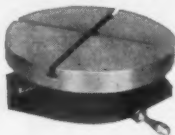
THE LINCOLN ELECTRIC COMPANY

DEPT. 3503 • CLEVELAND 17, OHIO

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

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- Saves fixtures and time consuming setups.
- Saves time in circular positioning.



CAM LOCKING TYPE ROTARY TABLES

Three sizes: 12", 15", 18"

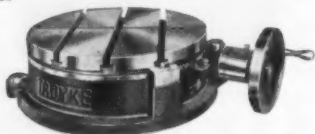
This model is intended for die sinking, bench work, and assembly of machine units when quick rotation and positioning are required.



STANDARD MODELS WORM WHEEL OPERATED ROTARY TABLES

Five sizes: 9", 12", 15", 21"

For die sinking, jig boring, cam milling. Indispensable in wood and metal pattern shops.



HEAVY DUTY MODELS WORM WHEEL OPERATED ROTARY TABLES

Three sizes: 18", 21", 25"

These larger, heavy duty models are used for jig work, planer jobs, and on horizontal boring mills.

DIVIDING ATTACHMENTS or DRILLING ATTACHMENTS can be furnished.

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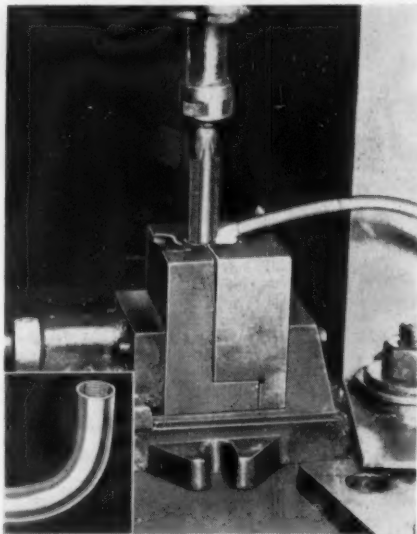


TROYKE MFG. CO.

CINCINNATI 9, OHIO

100 Per Cent Threads Tapped Faster with Spray-Lube System

AT the Standard Tool and Machine Company in St. Louis, the tapping of 100 per cent threads in the end of a section of thin wall aluminum tubing was a time-consuming, messy



Close-up view of tapping operation, showing how lubrication is efficiently applied to the tap and work by means of Spray-Lube system. Inset in lower left-hand corner shows type of tubing tapped with this setup.

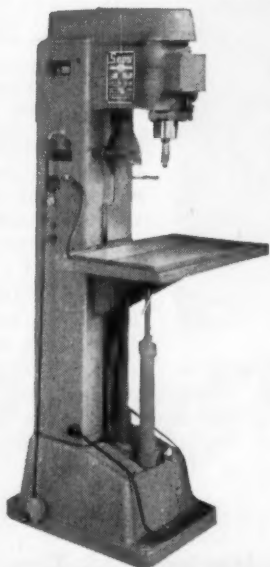
operation. The cutting compound used was a mixture of one-half mineral oil, lard and turpentine and one-half industrial wax. It was applied to the tap by hand with a brush.

Since a new Norgren Spray-Lube has been installed, the operation is much more efficient. Manual lubrication has been eliminated—now it's automatic. Better tapping quality has been obtained. The procedure is much cleaner, and machine output has been increased 35 per cent.

SNOW

MANUFACTURING COMPANY

455 EASTERN AVENUE • BELLWOOD, ILLINOIS



FULL UNIVERSAL MACHINES

Electrically Operated—Air Controlled

... *Drilling*—TYPE "UD"

Capacities from #60 through $\frac{3}{8}$ " in two sizes

... *Tapping*—TYPE "UT"

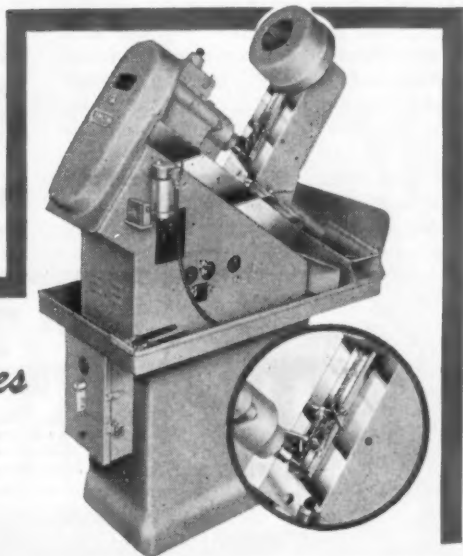
Capacities from #0 through $\frac{1}{4}$ " in four sizes

... *Threading*—TYPE "TR"

Capacities up to 1" in two sizes

AUTOMATIC and SEMI-AUTOMATIC
JIGS and FIXTURES
for Indexing and Clamping

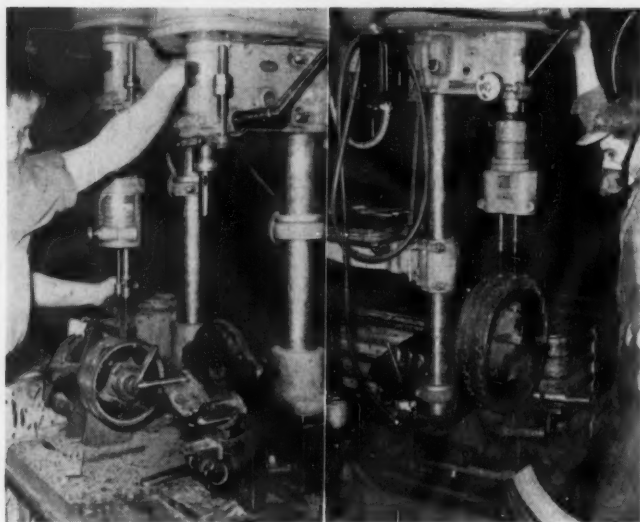
A complete line of basic Master Fixtures to permit adaptation of a wide range of parts at high production rate with low tooling cost.



FULL AUTOMATIC

Nut Tapping Machines

Completely automatic hopper feed nut tapping machines up to $\frac{3}{8}$ "—incorporating simplicity and low tooling cost. Standard taps are used. Precision class 3 and 4 fits and parallelism maintained at high speed and high production.



(Left) These two drill presses drill and ream, or drill and counterbore, some 400 brake shoes during an eight-hour shift. (Right) This drill press is used for counterboring and drilling 14 holes in brake shoes at the rate of about 550 shoes during an eight-hour shift.

Drill Presses Perform Double-Duty Operation in Brake Shoe Plant

THE Delta drill presses with multiple heads shown in the accompanying illustration play an instrumental part in the production of regular and heavy-duty brake shoes for the automotive industry at Timken-Detroit Axle's brake shoe plant in Ashtabula, Ohio. The two drill presses shown side-by-side at the left in the illustration drill and ream, or drill and counterbore, some 400 Duo Grip brake shoes during an eight-hour shift. In a very

This drill press works about 550 shoes during an eight-hour shift. In both drilling procedures, the brake shoes are ready for riveting immediately after leaving the drill presses.

similar operation, the drill press shown at the right is used for the precision counterboring and drilling of 14 holes in heavy-duty brake shoes.

Gage Inspects 13 Dimensions Simultaneously on Rear Planetary Carrier Assembly

A GAGE that inspects 13 dimensions simultaneously on a rear planetary carrier assembly is a recent

ON OILY AND GREASY FLOORS

STOP

COSTLY SLIPPING ACCIDENTS

USE Tamms FULLER'S EARTH

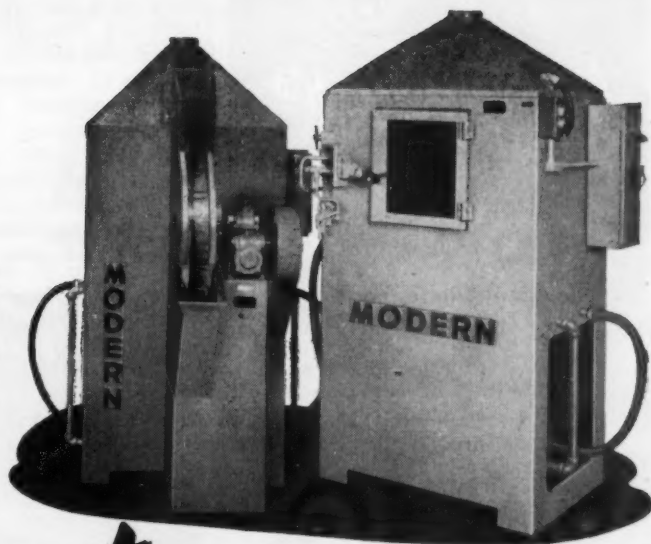
Adds greatly to the safety of your shop • Provides safe non-slip footing • Absorbs oil and grease • Lessens fire hazard because, unlike saw dust or wood shavings, it is non-inflammable • Every shop needs this low cost safety aid.

A trial will convince you. Send for FREE SAMPLE.

DEPT. RM-9

TAMMS INDUSTRIES, INC. 228 N. LA SALLE ST. CHICAGO 1, ILL.

Larger parts are deburred in Maizo Blast machine (right) with stationary fixture. Operation is automatic when door is closed. Small parts are deburred in model with continuously rotating ferris-wheel type fixture (left).



Blast THOSE BURRS! with Modern Maizo Blast

If you're being plagued with light burrs on high-production metal parts, get Modern Maizo Blast equipment and forget them.

Simply load the parts into a continuously rotating fixture if they're small—larger parts are placed on a stationary fixture in a door-operated model. The rest is automatic. A blast of high-pressure air containing ground maize or walnut shells quickly whisks off burrs.

Proper blasting material enables you to deburr without pitting finished surfaces.

Outstanding performance and quality are notable features of Maizo Blast equipment. That's because it's made by the maker of the famous Burr-Masters, the fastest production gear burring and chamfering machines available. Modern has put the same "know-how" into the Maizo Blast design to give the utmost in operating efficiency.

Write today
for Bulletin 103-57
covering Maizo
Blast equipment
for both small and
larger parts.

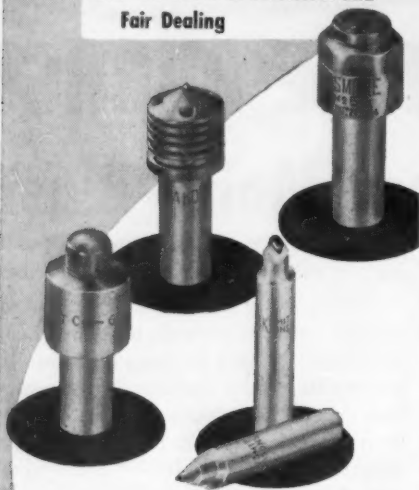
MODERN
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14230 BIRWOOD AVE.
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that add up to
1 fact...

You can depend on
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- Modern Plant with Modern Methods
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Strategically Located
- Over 65 Years of Successful and
Fair Dealing

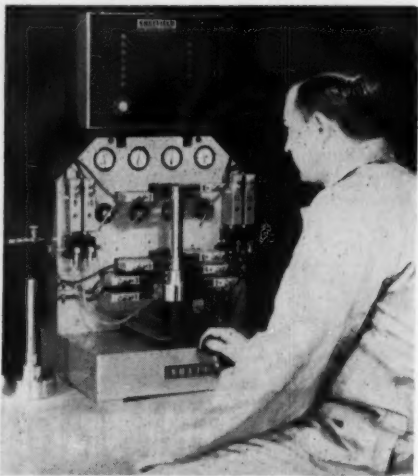


Send for your copy of our Tool Catalog
or perhaps you may wish to consult
our engineering staff for assistance
on your Diamond Tool problem.



J. K. SMIT & SONS, INC.
MURRAY HILL, NEW JERSEY

development of The Sheffield Corp., Dayton 1, Ohio. It indicates by means by colored electric lights whether or not the 13 dimensions are within tolerance, oversize, or undersize. Parts can be inspected on this gage at a rate of 600 to 800 per hour at 100 per cent efficiency. Dimensions checked include two locations on four outside diameters, the inside depth at four places, and outside height of the base.



Operator is shown using gage, designed to inspect 13 dimensions simultaneously on a rear planetary carrier assembly.

The instrument is set up with maximum and minimum masters.

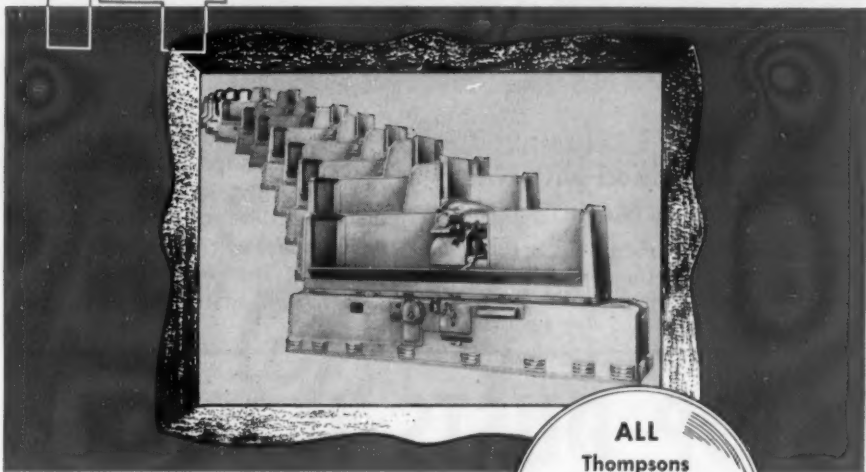
In using the gage, the operator merely places the part on the positioning fixture and slides it forward into gaging position. When all of the dimensions are within tolerance, the master light at the base of the light panel remains white and the 13 signal lights black out. However, if one or more dimensions are out of tolerance, the master light shows red and the signal lights indicate the faulty dimensions by becoming red for undersize or green for oversize. Lights of all correct dimensions black out.

LOOK CLOSELY AT THIS PICTURE

OF GRINDER PRODUCTION AND SEE WHY...

14 *is a lucky number*

for a manufacturer requiring precision grinding



After twelve years continuous manufacture of precision ground products, ten Thompson Surface Grinders proved so efficient and economical that this manufacturer ordered four more machines.

Thompson Grinders are available in a wide range of types and sizes from 6" x 18" to 72" x 384" to meet all production, special or tool room grinding requirements. The Thompson line includes machines from giant Hydrial Way Grinders to automatic Truform Jet Blade Contour Grinders, Dual Rotary Grinders and Broach Grinders.

CONTACT THOMPSON TODAY FOR HELP WITH YOUR MACHINING PROBLEMS

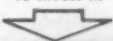
THE THOMPSON GRINDER COMPANY

Springfield, Ohio

ALL
Thompsons
operated continuously
with much
**LESS
DOWNTIME**

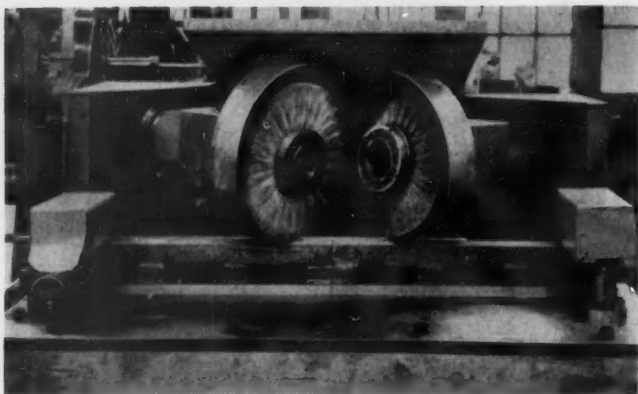
that's why

it will pay you
to invest in



**Thompson
Grinders**





This brushing setup designed by American Type Founders engineers with the cooperation of Osborn brushing specialists cuts deburring time from 50 minutes to 6 minutes for each gear rack. After the rack runs its complete 17-ft. length, a limit switch sends it back in the other direction. The brushes are also reversed to brush the gear teeth in the other direction to finish the other sides of the surface junctures.

Gear Rack Production Increase Obtained with New Brushing Method

A NEW mass production brushing method for the deburring and blending of surface junctures and sur-

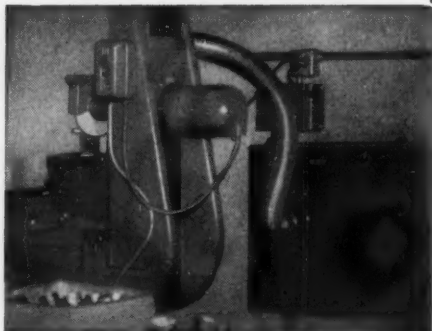
face irregularities of gear racks is resulting in unusual production increases for American Type Founders, Inc. Designed and developed by American Type Founders engineers, with the cooperation of The Osborn Manufacturing Company, to deburr 17-ft. gear

STOP DUSTS *Instantly* with **DUSTKOP**

Available from stock of
22 standard models
300 cfm to 10,000 cfm

for: Surface Grinders, Tool and Cutter Grinders; Polishers and Buffers; Abrasive Belts and Discs; Woodworking and Plastic Industry Equipment . . . DUSTKOPS collect almost all kinds of industrial dusts.

Ask for Catalog 605-2. Describe dust problem for recommendation by return mail—no obligation.



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207 Main St. Ann Arbor, Mich.

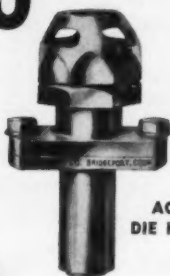


**SPEED UP YOUR
PRODUCTION**

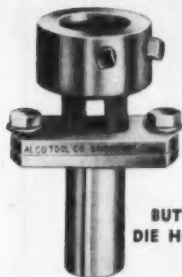
ALCO



**DRILL
CHUCK**



**ACORN
DIE HOLDER**



**BUTTON
DIE HOLDER**



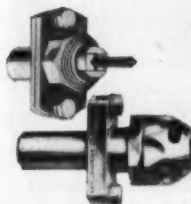
**TAP
HOLDER**

You can completely equip your screw machines with ALCO tools for every drilling, tapping, reaming and thread cutting operation and get more and better production at less cost because . . .

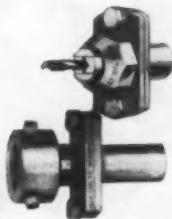
1. No bushings are needed. Drills and taps are held securely. No time lost in making special size bushings.
2. Change the drill or tap size without changing the chuck . . . each ALCO holder will accommodate several sizes.
3. Accurate concentricity is accomplished and guaranteed by the special Alco adjustment.
4. Taps and dies last longer because of the concentric alignment.
5. Every thread cut perfect, no taper threads, no rejects — each one die-true.

THE ALCO TOOL CO.

**52 Birdseye St.
BRIDGEPORT, CONN.**



ALCO TOOLS



racks, the new method, utilizing power brushes, has cut deburring and finishing time from 50 minutes per unit to less than 10 minutes.

The setup provides a completely automatic, gear driven sequence for deburring the gear racks at a speed of five feet per minute. When the entire rack has passed beneath the brushing area, a limit switch reverses both the direction of feed and the rotational

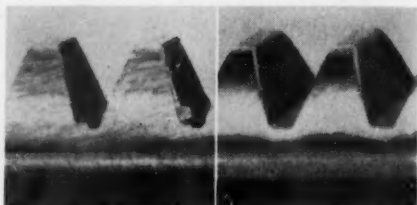


Illustration showing gear teeth (left) before and (right) after power brushing with Osborn Fascut fiber-filled brushes. The blending of surface irregularities and junctures disperses stresses which otherwise would concentrate at sharp edges and facilitate fracture and exaggerate the effect of local differences in electrical potential to promote corrosion.

direction of the brushes, finishing the two opposite sides of the gear teeth.

Special fiber filled Fascut brushes manufactured by Osborn were specified. They rotate at 1750 r.p.m., permitting conformation to the irregular contours of the gear teeth. The brushes also do a blending job where surfaces meet. Here, they form smooth curves at the junctures in place of fragile sharp edges.

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The EASY WAY!
 Ask for handy "Flip-a-page"
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Pick the Top "NAME BAND"

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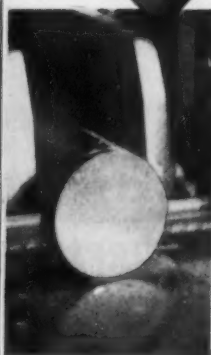
For Heavy Production Cutting

You'll like this rugged, break-resistant standard tooth blade for trimming gates and risers off castings, cutting metal bars and other tough production work. Hardened along the tooth edge only, it cuts fast, stays sharp, gives a longer run for your money! All standard widths and tooth spacings. Furnished in 100' and 300' coils or welded to length for specific machines.



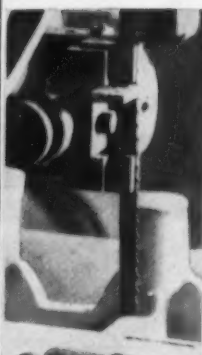
For Contour Cutting and Die Making

In the narrower widths, this edge-holding, smooth cutting blade is an outstanding favorite for contour work. Because the teeth are set with absolute evenness on both sides of the blade, you can depend on straight, on-the-line cuts with no "leading." All standard widths and tooth spacings furnished in 100' and 300' coils or welded to specified length.



For Horizontal Cut-Off Work

Furnished either Regular or Wavy Set in the wider widths, this Simonds-made standard tooth blade easily handles the wide variety of cutting required in general shop and steel warehouse operation. All sizes come in 100' and 300' coils or welded to length.



For Cutting Soft Materials

This Skip-Tooth Hard Edge Blade has extra gullet capacity with maximum blade strength . . . gives fast, trouble-free service in cutting aluminum, magnesium, plastics, plywood and hardwood. All standard sizes available in 100' and 300' coils or welded to length for specific machines.

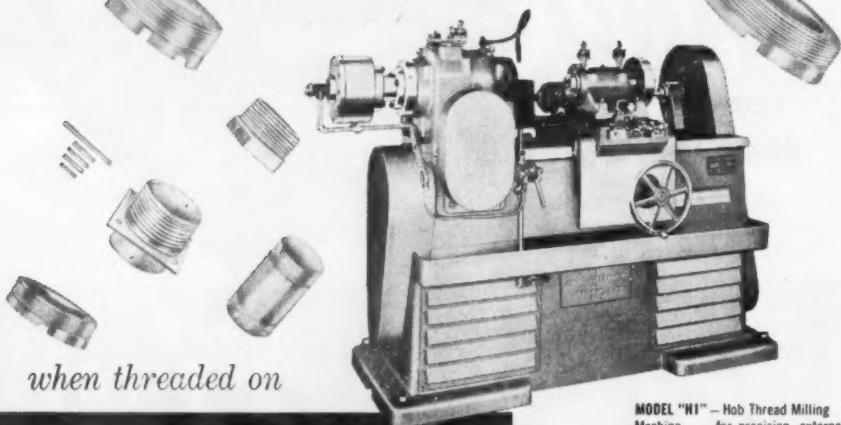
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mass-produced with
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 accuracy**



when threaded on

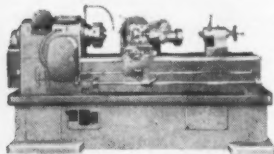
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MODEL "H1" — Hob Thread Milling Machine . . . for precision, external or internal, right hand and left hand threads . . . **AUTOMATICALLY!**

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MODEL "L1" —
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 for long precision square,
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"THREADMASTER" — Thread Milling Machine
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Speed up your production with one of the 3 COULTER Automatic Threading Machines for faster, better, and lower production cost parts. Insure yourself with the greatest margin of profits, yet produce parts with uncanny precision, perfect threading and have wide range versatility. Now you can be far ahead of all your delivery schedules. You can thread parts to desired lengths and diameters, use the metals your specifications require, and get a quality product on COULTER'S amazing threading machines. Everything is automatic.

Without obligation, consult our engineering staff with your specific threading problems. Catalog and machine specifications available upon request.

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The *James*
Coulter Machine Co.

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PORTER-CABLE ABRASIVE-BELT MACHINES

(Now Made and Sold by Engelberg)

Do More Surfacing Jobs FASTER and BETTER

Features high speed cutting by millions of abrasive points imbedded in a continuous belt, cooled and cleaned by water and other coolants. Does close tolerance work on flats, squaring, cylindrical surfacing; deburrs, knocks off corners, forms radii, bevels and other operations. Often does milling, shaping, grinding operations 10 times faster — saves 75-90% set-up time.



PLATEN OR FREE BELT

Model B-6W. Quickly adaptable to flat, curved or irregular pieces. Various shaped platens form the flexible abrasive belt to fit many shapes of work. Free belt reaches inaccessible spots.



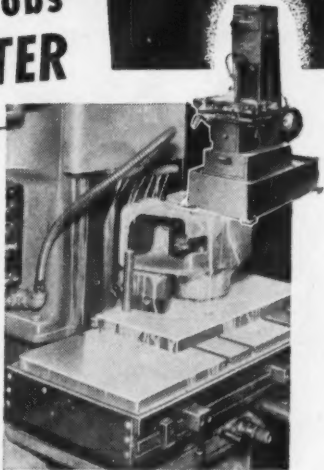
CONTOUR GRINDER

Model C-6. For curved or flat-face grinding or polishing. Flexible abrasive belt runs over shaped contact roll. Loaded abrasive wheel no longer necessary. Wide-range adjustments easy for varied work. Saves set-up time and reworking of piece.



FINAL FINISH

Model WG-4. For production runs on small parts, fed freehand or by simplest fixtures. Gives final finish to jobs done on automatics, hand and hacksaws, lathes, milling machines, etc. Grinds carbide tipped tools.



BG8/FT9 Grinds Casting 100% Faster; No Distortion

Problem: Machine two rim surfaces of aluminum oil burner casting with single set-up.
Solution: Model BG8/FT9 with indexing fixture. Both sides are ground without moving the piece. Net grinding time for two surfaces: 15 seconds. This was 100% faster than former milling time. In spite of rapid stock removal there was no distortion.

• FREE SAMPLE GRINDING

We will prove Abrasive-Belt Machining can cut your costs. Send samples for recommendations and actual test grinding. No obligation.

The ENGELBERG Huller Co., Inc.
106 Seneca St., Syracuse, N. Y.

Send case history booklet and name of nearest distributor.

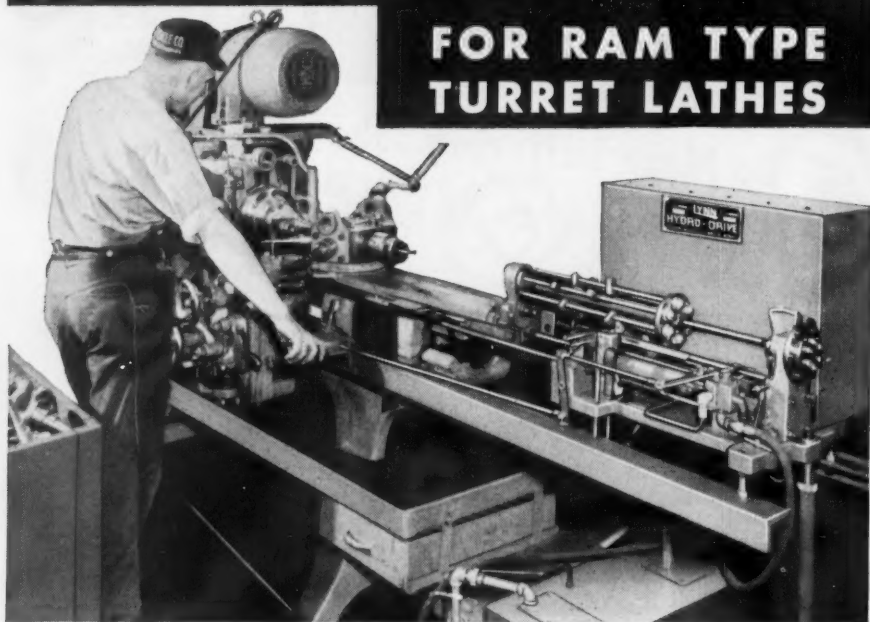


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LYNN HYDRAULIC DRIVE

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When production schedules are tight—and when rising costs and competitive bids start to pinch—have our factory engineers install Lynn Hydraulic Drives. The increase in production is drastic. Increases to 100% are common. 20% increase is guaranteed. (And with Lynn Hydraulic Drives almost anyone can do precision work.) A demonstration does not obligate you.

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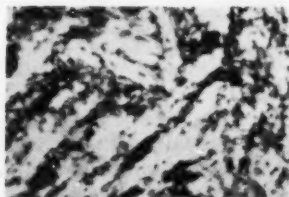
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MINNEAPOLIS, MINN. — 1123 SOUTH SEVENTH ST. — MINNEAPOLIS 4, MINN.

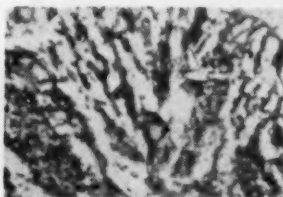
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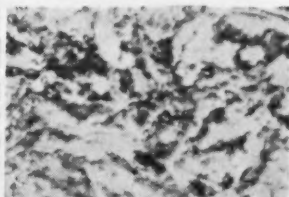
Typical Microstructures (at 1000 X) and Hardnesses, 4140 Steel



Hot Rolled—Hardness 285 BHN



Normalized 1650F
Hardness* 302 BHN



Normalized 1650F and drawn
at 1250F for 1 hour—
Hardness 217 BHN

For applications of mechanical tubing that require high strength, ductility, and resistance to impact, the medium-carbon, through-hardening steels are particularly suitable. A correlation of the properties of each available grade with your product specifications will help you determine the grade most suitable for your operation. Listed are the medium-carbon alloy steels typical of those that can be heat-treated to meet a broad range of mechanical properties. These steels all contain alloying elements introduced to provide a desirable combination of strength and ductility and to promote ease of heat treatment. In some grades the alloying elements also provide resistance to softening at higher tempering temperatures.

Tubing of these grades may be hot forged without difficulty by conventional methods, and in the softened state is readily machinable—a good indication of the workability common to all the medium carbon through hardening.

In the application of alloy tubing of these steels, it is often possible to use alternate grades without loss of desirable mechanical properties. You'll find Mr. Tubes—your link to B&W—always on call and invariably helpful in any discussion of your tubing requirements. You'll find B&W Bulletin TDC-141 helpful, too. Send for your copy today.

TYPICAL THROUGH-HARDENING GRADES

1340	2340	3140
4042	4140	4340
4640	5140	8640
8740	9440	

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Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing



TA-4027 (ASM)

ideas from readers.

Recentering or Driving Device for Shafts

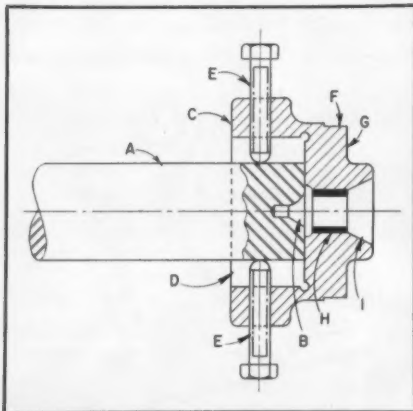
By W. M. HALLIDAY
England

A HANDY device for use in recentering shafts or similar cylindrical parts on a lathe is shown in the accompanying sketch. This device can also be used as a driving means in a lathe for cylindrical objects in which correction of a damaged center hole is not essential.

The sketch shows the device mounted on the end of a shaft, **A**, in which a badly damaged center hole, **B**, must be corrected. The device comprises a

cast iron or mild steel cylindrical member, **C**, which is bored out at one end, as shown at **D**. The diameter of this recess is slightly larger than that of the largest shaft to be accommodated by the device. The bottom of the recess is absolutely flat and concentric with the center of the recess so as to permit the device to be accurately located against the machined endface of the shaft **A**.

Four set screws, **E**, are provided in the sidewalls of recess **D**, these screws being located equidistant around the periphery of the recess. The screws are made of hard brass and rounded on the ends to prevent marring of the shaft **A**. The shoulder **F** and endface **G**, both machined concentric with recess **D**, are provided for accurately setting the device with reference to the shaft **A** by means of a dial indicator. A small diameter hole is drilled centrally through the right-hand end of the device to accommodate a hardened steel bushing, **H**, which is press fitted into the hole with its foremost end even with a shallow recess cut in the base wall of the large recess **D**. The



Sketch of simple device for use in recentering or driving cylindrical parts in a lathe.

extreme right-hand end of the hole is machined to a 60-degree included angle, as shown at **I**, to suit an ordinary center bit or revolving center. The inner diameter of bushing **H** is of sufficient size to accommodate, in a close-sliding fit, a standard center drilling tool.

To use the device, the shaft **A** is mounted in the lathe chuck and adjusted so as to run true according to the usual dial indicator check. The device **C** is then positioned over the damaged end of the shaft in such a manner as to bear against the machined endface of the shaft and with the four screws **E** adjusted so that the device runs true, as revealed by dial indicator readings on surfaces **F** and **G**. Next, a center drill fastened in the tailstock spindle is fed slowly through the bushing **H** and into the damaged center hole **B**, thereby truing up the center hole concentric with the outside surface of the shaft. The bushing **H** serves to maintain accurate alignment of the center drill as it begins its entrance into the damaged center hole.

In cases where it is not essential to correct such a damaged center hole, the device may be mounted on the shaft in exactly the same manner and the regular lathe center inserted in the tapered hole **I** of the device so as to properly support and accurately align both the shaft and the driving device during the turning of the work-piece.

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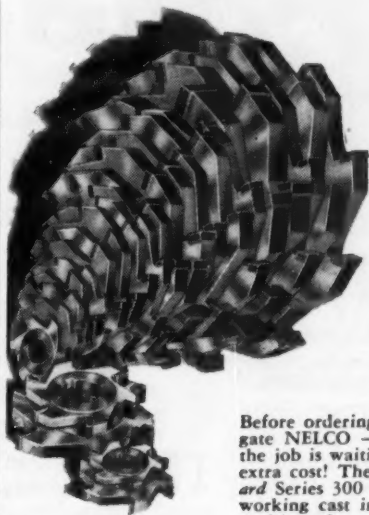


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NELCO TOOL COMPANY, INC. MANCHESTER, CONNECTICUT



Illustration showing how modified dolly allows for easy loading of heavy metal-filled barrels by a single worker at Chance Vought Aircraft

Modified Scrap-Collection Dolly

By E. J. BASSINGTHWAIGTHE

MODIFICATION of a scrap-collection dolly to permit easier loading of metal-filled barrels has speeded up the job at the Chance Vought Aircraft plant in Dallas, Texas, and saved several thousand dollars annually. The bed of the four-wheeled dolly formerly was situated 20 inches above the factory floor, and two men were required to hoist the heavy metal-filled barrels up onto the dolly. One of

the operators suggested redesigning the dolly to lower the bed to within 6 inches of the factory floor. Then, by using a hand cart, one man could handle the job, as shown in the accompanying illustration. This idea has saved time, money, and possible back injuries to workers.

Elastic Ejector for Small Drawing Dies

By FEDERICO STRASSER

IN a combination die for the simultaneous blanking and drawing of small workpieces of the type shown at A in the accompanying sketch, we were faced with the problem of how to eject the finished shells from the



DYKEM STEEL BLUE

Stops Losses

making Dies and Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

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With DYKEM Steel Blue

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GEARS NOISY? ...Of Course

The Gear Business has always seemed to attract colorful and positive characters. Like George B. Grant, the Dean of Gear Makers in the Gay Nineties.

Sixty years ago he gave industry a few gems of philosophy in what he referred to as his Treatise on Gears.

For Instance:

Noise: at a high speed is unavoidable. Fibre gears are quieter and softer than metal, and raw-hide is still quieter and less durable. Raw-hide and fibre are good at high speed, but unsuitable for heavy strains.

I Am Not Responsible for Any Mistake: even if I make it myself, it it could have been prevented by sending me working drawings or good sketches. If you make me guess, you must take the responsibility. A poor drawing is better than none.

Unless Otherwise Described: every gear ordered is a cut spur gear of cast iron, and it will have such diameter, pitch, face, hole, hub, and quality as I happen to think most desirable. Describe what you want and that you will get, but if you omit any detail I may write to you for the information required or I may guess at it and go ahead.



A Pit: is guaranteed only when I have the parts to be fitted. I ream a hole with a one inch reamer, for example, but do not guarantee that it will fit your one inch shaft.

Estimates: As a rule nothing is saved by getting an estimate. A low price means a cheap piece of work, here or elsewhere.

Steel Castings: are generally full of blow holes, and it takes a long time to get them. A cast iron gear of wider face is as strong and cheaper.

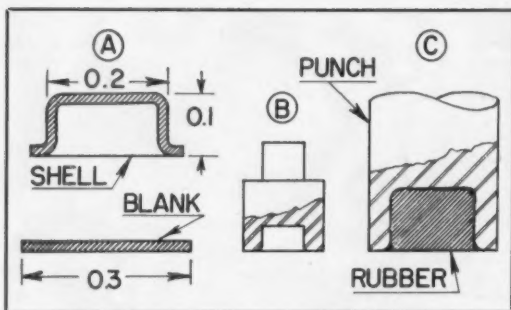
If Mr. Grant could only have run a sound test on RED RING Shaved Gears,



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6824



A—Dimensional drawing of blanked and drawn shell. B—Combination punch and die used in blanking the drawn shell. C—Enlarged view of punch, showing rubber ejector incorporated therein.

drawing die, **B** (which also serves as the blanking punch). In view of the smallness of the entire tool, it was not practical to utilize any of the standard devices ordinarily used for ejection purposes, such as springs, positive-acting ejectors, rubber pads, and so on, since there was simply no place for such devices.

Consequently, we filled the die cavity with a piece of eraser rubber, as shown at **C** in the sketch, which per-

mits the comparatively shallow workpiece to be drawn; however, when the drawing punch is withdrawn the piece of rubber has a tendency to recover its original shape, thereby ejecting the workpiece. Obviously, the slightly conical shape of the shell makes the operation of ejection rather easy.

In actual practice, we have found the drawing die with rubber ejector to be highly successful. The only disadvantage is the comparatively short duration of the rubber ejector (a couple of thousand shells), making it necessary to change the ejector rather

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Special ARC-FITS for angular cuts or larger sizes. Send drawing and material specification for quotation.

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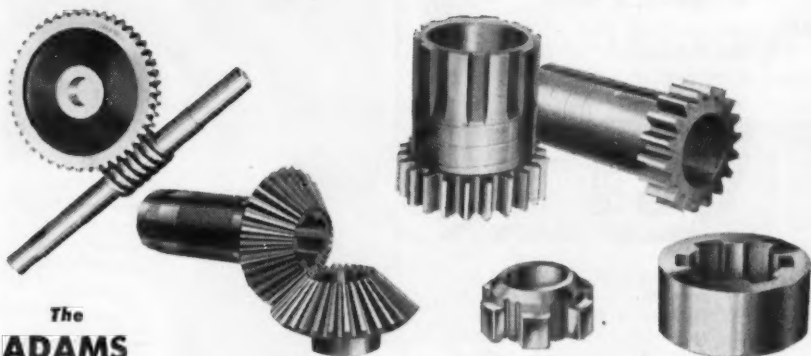
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Adams Gears are custom made exactly to your specifications. The combination of skilled workmanship, precision equipment, and quality control give you assurance of outstanding quality. This, in turn, assures the dependable performance of your product. The Adams Company, 1942 Cypress Street, Dubuque, Iowa.

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frequently. On the other hand, the cost of the rubber is low and the time required in replacing same is very little.

Handy Cleaning Tool for Machinists

By EDWARD V. SMITH

THE combination slot cleaner and chip shovel shown in the accompanying illustration is designed to fit

SHEARCUTTER SHEARCUTTING TAP

Ends Tapping Trouble

- Produces threaded holes by a Shearcutting action
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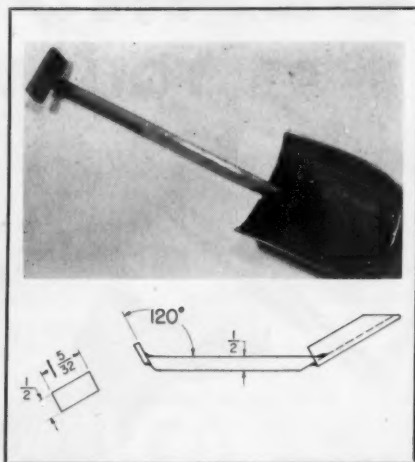
Used by practically every large manufacturing company in the U. S. Patents received, pending or applied for.

SHEARCUT TOOL COMPANY

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all T-slots ranging from $\frac{5}{8}$ to $1\frac{1}{4}$ -inch nominal bolt size. This handy time-saving tool can also be used in dead-



(Above) Combination slot cleaner and chip shovel. (Below) Drawing of tool, showing most critical dimensions

end slots since it may be inserted sideways in the slot and then twisted so that the handle extends parallel with the slot.

Inasmuch as the tool has to fit several slot sizes, those dimensions that are rather critical are shown on the drawing. The tool is made entirely of No. 11 or No. 12 gauge sheet steel that is firmly welded together at two points.



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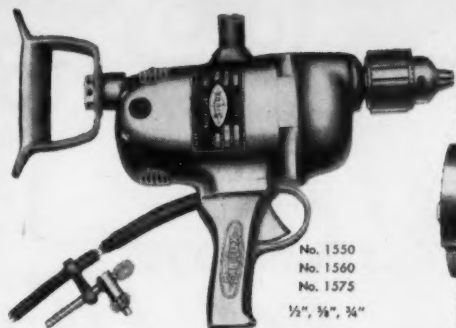
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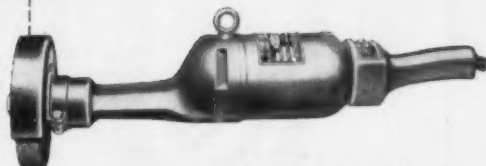
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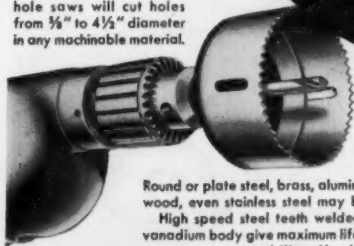


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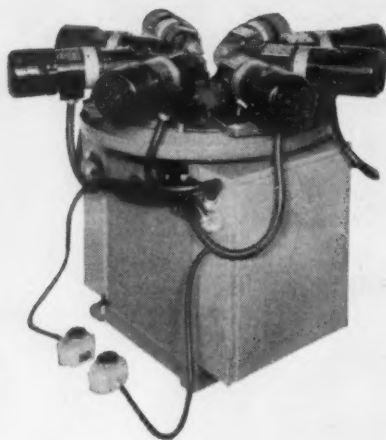
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The machine may also be used for tapping operations with Govro-Nelson Tapping Units. It has a range of 1/32" to 3/8" on drilling operations and 0-80 to 3/8-16 on tapping operations, depending on material and spindle speeds. A single, momentary contact start-button causes all units to operate simultaneously.

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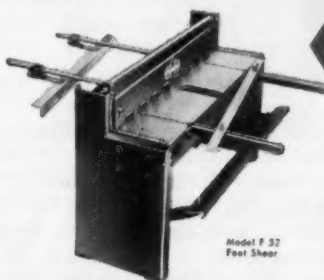
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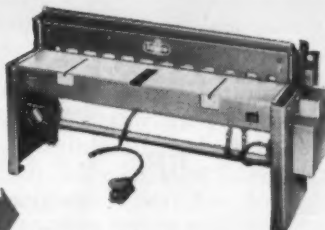
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Model F 52
Foot Shear

**Foot Shears
in 6 models**

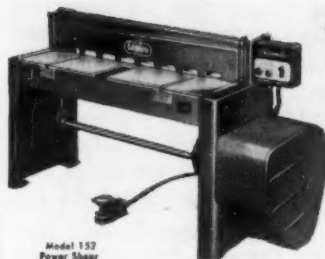
Capacity: 16 gauge mild steel in 36", 42" and 52" widths, and 18 gauge in 22", 30" and 72" widths. All-steel box-type construction.



Model A 72
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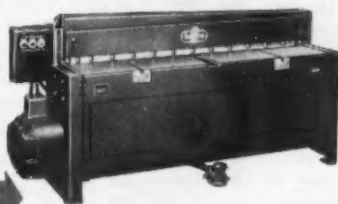


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news of the industry

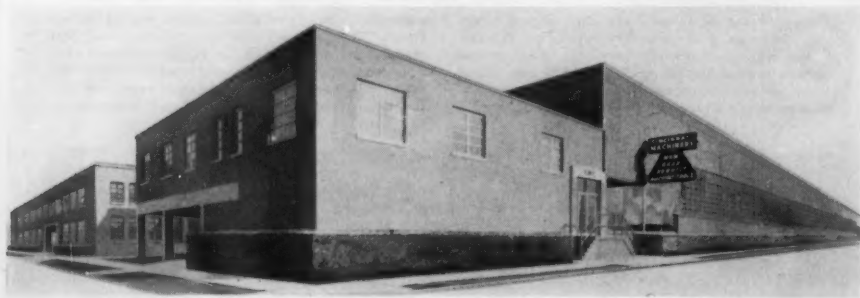
Cincinnati Machinery Company Holds Open House in New, Modern Facilities

Cincinnati Machinery Co., Inc., dealer in new and rebuilt machine tools, announced the grand opening of its new plant and offices recently with an open house celebration. Over 600 representatives of the industry and press attended the party which also commemorated the company's 32nd anniversary. Completed only recently, the new facilities at 3900 Kellogg Avenue in Cincinnati are modern in design and construction. The warehouse area measures 80 x 220 ft. and contains the latest in inventory facilities. A modern wing, measuring 68 x 68 ft., houses

the company's executive offices and reception room.

Cincinnati Machinery Company, Inc., was established as the Cincinnati Machinery & Supply Company and was founded in 1922 by two brothers, Thomas and John Longo, in a small store room in Cincinnati. Almost immediately the business began growing, and in 1925 the company acquired the Queen City Machine Tool Company which was made a department of the Cincinnati Machinery organization. In 1946, a corporation was formed and the name of the company was changed to Cincinnati Machinery Company, Inc. During the years that followed, business continued its up-

New, modern facilities of Cincinnati Machinery Company, Inc.



ward trend, making it necessary to once again secure larger facilities. In 1952, an acre of land with a building measuring 86 x 185 ft. long at the Kellogg Avenue address was purchased to provide the additional quarters. The building was used to house the company's entire rebuilding department. The new facilities were then erected. Thomas and John Longo still head the corporation as president and secretary-treasurer, respectively.

Kidde Precision Tool Plans New Plant

Plans for the construction of a new 61,500 sq. ft. plant to be located on a 65-acre tract at Roselawn, New Jersey, have been revealed by Kidde Precision Tool Corporation, formerly known as the Bloomfield Tool Corporation. Upon completion of the new plant, the company will vacate its present Bloomington, New Jersey, facilities and move all of its activities to the new location. The Roselawn plant will be modern in its architecture and landscape. Of one-story construction, the 50,000 sq. ft. manufacturing area will have overhead crane facilities

throughout and will be at the rear of a 11,500 sq. ft. office building. A large part of the factory will be air conditioned, as well as the entire office areas. A parking lot for 400 automobiles is planned.

A wholly-owned subsidiary of Walter Kidde & Co., Belleville, N. J., the company specializes in large precision, close tolerance, intricate machine work and engages in custom built machinery and parts to specifications.



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On the toughest metal cutting jobs, Atlantic Wavy Set Bands always deliver faster, more accurate "gravity fed" machine cutting — bite through hardened steel in seconds flat — leave score-free, finished surfaces. Here's the secret behind this vastly superior performance: Atlantic special design band with a wave of teeth to the left, then to the right, sweeps away chips as it cuts — provides cool, free operation throughout prolonged blade life.



TUBING



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Wash drawing of new plant of Boyar-Schultz Corp., Broadview, Illinois

New Boyar-Schultz Plant Nearing Completion

The new building to be occupied by the general offices and manufacturing plant of Boyar-Schultz Corporation is rapidly nearing completion. Situated on a 7½-acre tract at 2000 25th Avenue in Broadview, Illinois, the new building will provide 71,000 sq. ft. of space—an increase of approximately 30 per cent over the present facilities. The new building represents the fourth increase in size since 1928 when the company was founded. The company has branch offices in New York City and in Los Angeles, and a force of 75 franchised distributors maintains nation-wide distribution. The firm is headed by Frank Korte, who is chairman of the board and president.

A. E. Thornton Elected Board Chairman of Skinner Chuck Company

Skinner Chuck Company and Skinner Valve Division have announced the

election of President Arthur E. Thornton as chairman of the board of directors. Paul K. Rogers, Jr., vice president, succeeds Mr. Thornton as president of the company. Mr. Thornton has been associated with the company for 39 years. He was made a director in 1931, a vice president in 1936 and president in 1938. Mr. Rogers was also re-elected treasurer and to the board, on which he has served since 1938. Before joining Skinner, Mr. Rogers was associated with Jones & Lamson and South Bend Lathe.

Sherrod E. Skinner was elected a director of the company to fill the vacancy left by his father, E. J. Skinner, former chairman of the board who died in 1953. Mr. Skinner is also a vice president and director of General Motors. Robert D. Twohig was appointed assistant secretary and controller of the company, James N. Skinner was re-elected vice president and director, and Kenneth H. Walther, sales manager of the Chuck Division, was re-elected secretary and director.



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Made from selected steel or brass, rolled to precision limits, oiled to resist stain and rust, free from burrs. Twelve assorted thicknesses .001" to .015", sheets 6" x 12", coils 120", identified every 6" by thickness and amount remaining on roll.



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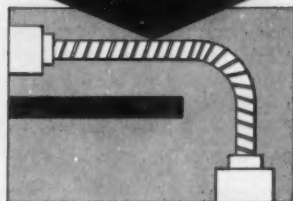
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When working out power drive or remote control applications, it's well to remember that a *single* S.S. White flexible shaft can usually do the same job as comparatively complicated systems of bevel and worm gears — universal joints — straight shafts and bearings — and similar mechanical systems. By using an S.S. White flexible shaft, you'll save parts, cut assembly time and costs — and end up with improved designs.

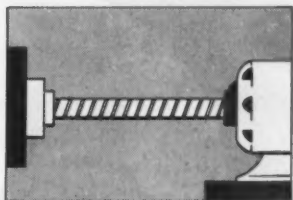
THE FLEXIBLE SHAFT HANDBOOK contains 256 pages of facts and data on flexible shafts. A copy will be sent free if you request it on your business letterhead.



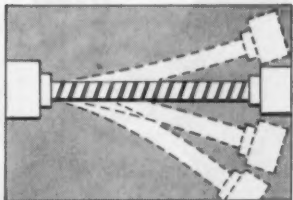
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Avoiding alignment problems. A flexible shaft automatically compensates for misalignment.



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Philip O. Geier

Philip Otto Geier, treasurer and chairman of the board of The Cincinnati Milling Machine Co., Cincinnati, Ohio, until his retirement, died recently in Tucson, Arizona, where he had been residing because of ill health. Born in Cincinnati in 1876, Mr. Geier was associated with Cincinnati Milling for 47 years. He became treasurer of the company in 1911 and chairman of the board in 1934, holding both offices

until his retirement in 1946. He continued as a director of the firm until 1952.

Prominently identified in public affairs in Cincinnati, Mr. Geier was a member of the Rapid Transit Commission that built the first boulevard in Cincinnati. He was also commissioner for a new charter for Hamilton County. He was active in many organizations, holding such posts as director and president of the Cincinnati Chamber

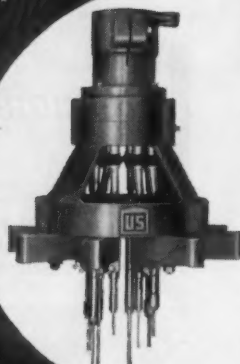
of Commerce, president and trustee of the Ohio Manufacturers Association, director of the



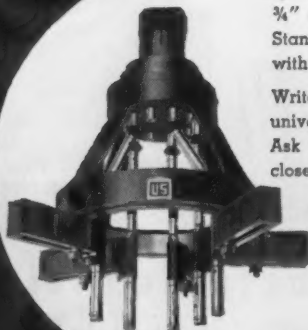
Philip O. Geier

National Association of Manufacturers, president of the Gibson Hotel Company, trustee of the Cincinnati Southern Railroad, director of the First National Bank of Cincinnati, councilor of the National Metal Trades Association, chairman of Cincinnati and Hamilton County Defense Council and many others.

KEEPING UP WITH THE JONESES



U-1



U-2

The "Joneses" and the companies they own save money, time and effort by relying on "US" Adjustable Multiple Spindle Drill Heads with QUICK-CHANGE universal joint assemblies.

We give the "Joneses" and you—immediate delivery

The U-1 Head—two to eight spindles—can be adjusted to a minimum distance between spindles of 11/16" anywhere in an area of a 6" diameter circle.

The U-2 Head has two to twelve spindles, each built to drill up to 3/4" diameter hole in cast iron. Standard spindles are furnished with No. 1 or 2 Morse Taper.

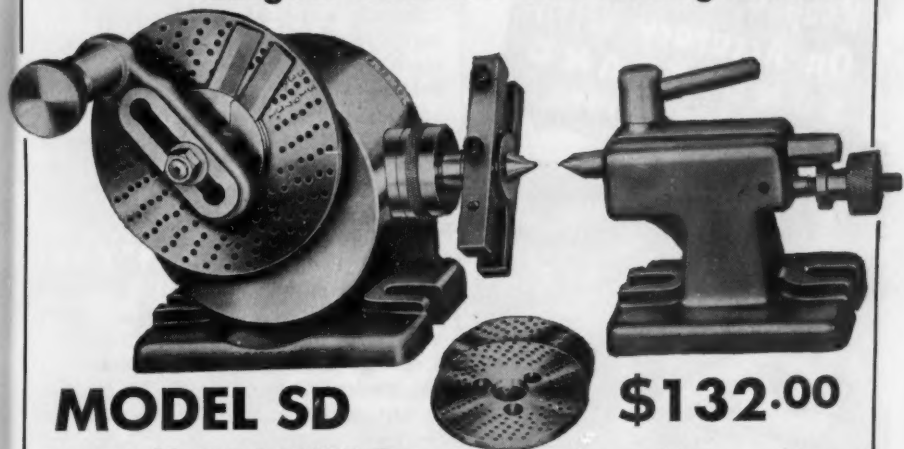
Write for details on any type of universal joint adjustable head. Ask also about our totally enclosed gear driven adjustable, fixed center, or individual lead screw tapping heads.



UNITED STATES DRILL HEAD CO.

616-618 Burns St., Cincinnati 4, Ohio

**Outstanding Values by America's
Largest Builders of Dividing Heads**



MODEL SD
6 1/2" SWING Ideal for smaller milling machines.

\$132.00

SPINDLE THREADED 1 1/2"-8 TO FIT L-W 5" UNIVERSAL CHUCK

Heavy duty headstock and tailstock designed for maximum rigidity. Alloy steel threaded headstock spindle with extra large tapered bearing and takeup adjustment collar. Head tilts to 90° in vertical position. Alloy stress-proof steel worm and

accurately cut worm wheel cut to close limits for accuracy. Ball bearing thrust and adjustable for end play. Complete with three index plates for dividing all numbers to 50 and even numbers to 100, except 967. Index chart shows all divisions obtainable to 360. Right or left hand models. Ship. wt. 36 lbs.



Model BP 11" Swing for plain milling machines. Shipping weight, 140 lbs....

\$225.00



Model AU 11" Swing. Fully Universal for complete indexing and spiral cutting. Shipping weight, 190 lbs.

\$327.50

IMMEDIATE DELIVERY

Order from your industrial supply distributor or order direct, giving name of your distributor.

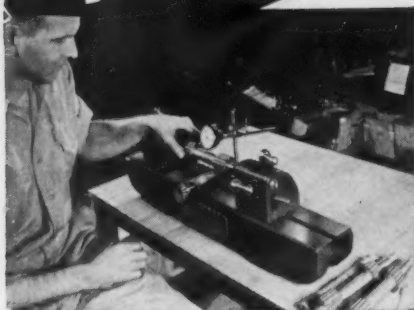
Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



L-W CHUCK COMPANY

28 SO. ST. CLAIR ST.
TOLEDO 4, OHIO

Keep a Close Check On Accuracy With **SUNDSTRAND** Bench Centers



Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

"One-hand control" over all movable elements leaves the operator's other hand free to control rotation of the part being checked. Either headstock or tailstock can be unclamped, positioned and locked in place with a single hand operating the top lever. Investigate this bench center today.

Complete Range as Follows:

6" x 18"	12" x 48"	24" x 48"
6" x 36"	12" x 60"	24" x 60"
12" x 36"	12" x 72"	24" x 72"

FREE Additional Data

covering complete specifications and additional features is contained in this bulletin. Write for your copy. Ask for data sheet 545



SUNDSTRAND MACHINE TOOL CO.
2539 Eleventh Street, Rockford, Ill., U.S.A.

Jones & Lamson Enlarges Board of Directors

At the Jones & Lamson Machine Company's annual stockholders' meeting held recently in Springfield, Vermont, a new and larger board of directors was elected. Increased from seven to nine, the new board brings the benefit of the outside business viewpoint to J&L.

Elected to the board of directors were E. S. French, chairman of the board of Boston & Maine and Maine Central Railroads (and re-elected chairman of J&L's board); K. Hazen Woolson, vice-chairman; Hardage L. Andrews, J&L president; Charles E. Cotting, president and treasurer, Lee Higginson Corp.; Carl F. Woods, chairman of the board, Swank Inc., member of the boards of Arkwright Mutual Fire Insurance Co., Angier Corp., The Felters Co., Instron Engineering Corp., New Ocean House, Inc., and Whittemore Associates, and also a trustee of the Winchester Savings Bank; R. W. Stoddard, executive vice president, Wyman-Gordon Co., director of the First National Bank of Boston, vice president and director of National Association of Manufacturers, vice president of Associated Industries of Massachusetts, trustee of Worcester County Institute for Savings, and trustee of Worcester County Trust Co.; John E. Lovely, vice president and chief engineer, J&L; Holmes H. Whitmore, treasurer and general manager, J&L; and J. Hartness Beardsley, executive vice president and general manager, Bryant Chucking Grinder Co., and clerk of the corporation of Jones and Lamson.

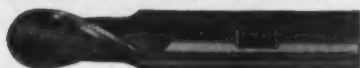
Immediately following the stockholders' meeting, the new board of directors met for election of company officers. In addition to re-electing the 1953 officers, the board elected Norman T. Harrison to the position of controller, a newly-created officership of the company.

**ALL THESE
1/2" DIAMETER**



**HI-HELIX
END
MILLS**

**TWO
FLUTE**



BALL NOSE TYPE — LIST NO. 360



REGULAR TYPE — LIST NO. 356



LONG (EXTENDED) TYPE — LIST NO. 3561



DOUBLE END TYPE — LIST NO. 357



Available FROM STOCK at STANDARD PRICES

FOUR FLUTE

**FOUR FLUTE STYLES - -
AVAILABLE IN TWO
END TOOTH DESIGNS**



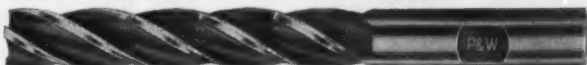
**1. CUT-TO-CENTER
TYPE . . . pre-
ferred for mill-
ing jobs requir-
ing radii on the
end teeth.**



REGULAR TYPE — LIST NO. 358



LONG TYPE — LIST NO. 3581



EXTRA LONG TYPE — LIST NO. 3582



**2. CUPPED TYPE
. . . preferred
for all general
milling oper-
ations.**



DOUBLE END TYPE — LIST NO. 359

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COMPLETE INFORMATION**



PRATT & WHITNEY MMS-54
DIVISION NILES-BEMENT-POND COMPANY

25 Charter Oak Blvd., West Hartford 1, Connecticut

Please send my free copy of Circular No. 534.

NAME _____

POSITION _____

COMPANY _____

CO. ADDRESS _____

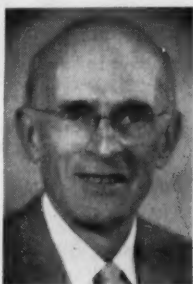
CITY _____ **ZONE** _____ **STATE** _____

Twogood Changes Company Name to Wheel Trueing Tool Company of California

Harry W. Twogood, president of H. W. Twogood, 5560 Alhambra Ave., Los Angeles 32, Calif., has announced that his company name has been changed to Wheel Trueing Tool Company of California. Mr. Twogood established the California company more than 30 years ago when he settled in Los Angeles and started sup-

plying the West Coast with diamond tools of his own manufacture, as well as those made by Wheel Trueing Tool Company of Detroit. His company built up a wide following throughout the Pacific states, Nevada and Arizona. He later built a modern factory and installed the newest equipment and practices for diamond tool manufacture and for the equally important business of resetting worn diamond tools.

Facilities of the company will be expanded to serve better the West Coast market, and additional



Harry W. Twogood

salesmen will work out of the Los Angeles headquarters. H. F. Soderling will continue to serve the Seattle and Washington territory, and H. E. Linney Company will continue to cover their established territory from Oakland, California. Officers of the new company are Mr. Twogood,

**NO GUESS-WORK
WHEN YOU SEE
THIS MARK**



Engineers and designers know they can depend on Curtis Joints — because catalogue torque and load ratings are substantiated by constant tests under actual working conditions.

Curtis quality control, precise design and careful manufacture from specially selected steels insure long life, efficient trouble-free performance.

CURTIS UNIVERSAL JOINTS

- 14 sizes always in stock — bored or unbored hubs
- Fewer parts, simpler construction
- Complete equipment for government tests

PLUS — facilities and engineering skill to handle special specification jobs at any time.

Not sold through distributors. Write direct for free engineering data and price list.



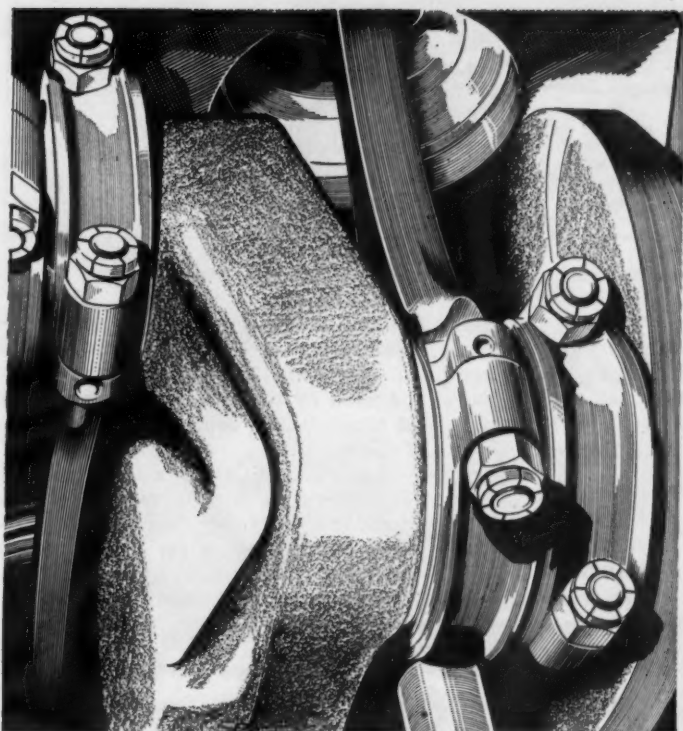
Trade Mark

CURTIS
UNIVERSAL JOINT CO., INC.

10 BIRNIE AVE., SPRINGFIELD, MASS.

As near to you as your telephone

A MANUFACTURER OF UNIVERSAL JOINTS SINCE 1919



More and more automotive repair shops and industrial plants are turning to FLEXLOCs to reduce maintenance on high speed, vibrating equipment.

FLEXLOC locknuts save \$600 per year in reconditioning automobile engines

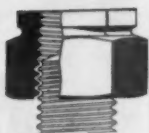
By using FLEXLOCs on connecting rod bolts, a motor reconditioning shop cut assembly time by a minimum of 5 minutes per motor. This added up to a yearly saving of 250 hours or \$600. No drilling of bolts was needed . . . no adjusting of nuts to set cotter pins was required. And the FLEXLOCs assured a tighter assembly than was possible with the castellated

nuts and cotter pins formerly used. FLEXLOCs are reusable. They can be applied again and again without losing locking efficiency.

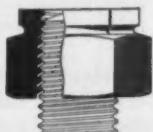
You can get FLEXLOC Self-Locking Nuts of various types and materials in a wide range of sizes from leading industrial distributors everywhere. Write for literature and samples for test purposes. STANDARD PRESSED STEEL Co., Jenkintown 22 Pa.

FLEXLOC LOCKNUT DIVISION

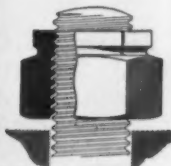
SPS
JENKINTOWN PENNSYLVANIA



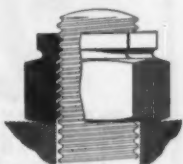
Starting. A FLEXLOC starts like any ordinary nut. Put it on with your fingers. Tighten it with a standard hand or speed wrench.



Beginning to Lock. As the bolt enters the segmented locking section, the section is expanded, and the nut starts to lock.



Fully Locked As a Stop Nut. When $1\frac{1}{2}$ threads of a standard bolt are past the top of the nut, the FLEXLOC is fully locked. A FLEXLOC does not have to seat to lock.



Fully Locked As a Seated Nut. When it is used as a lock or stop nut, the locking threads of the FLEXLOC press inward against the bolt, lifting the nut upward and causing the remaining threads to bear against the lower surface of the bolt threads. Vibration will not loosen a FLEXLOC, yet there is no galling of threads.



Drawing of expanded plant of Raymond Corp., Greene, New York

president; Helen Twogood, assistant secretary-treasurer; Donald J. Wallace, vice president; Robert S. Fowler, vice president; Harold E. Robison, secretary and treasurer; and Harvey B. Wallace, chairman of the board.

Raymond Corporation Plans Plant Expansion

The Raymond Corp., Greene, N. Y., has announced an expansion program

which incorporates a new single-story plant with offices, totalling 55,000 sq. ft. The first 15,000 sq. ft., which will be used by the assembly department, is scheduled for completion in the near future.

According to George G. Raymond, Jr., executive vice president of the company, a steady increase in business, together with anticipated growth brought about by new and improved products, necessitate the additional facilities.

**ONLY ACME
OFFERS YOU**

2
**BUSHING
STANDARDS**

ACME

Industrial Company

212 N. LAFLIN ST.
CHICAGO 7, ILL.

MAKERS OF HARDENED
AND GROUND PRECISION PARTS

A. S. A. STANDARD
Includes
7114
Different Drill
Sizes and Lengths
IN STOCK

ACME STANDARD
Includes
9870
Different Drill
Sizes and Lengths
IN STOCK

**TOTALING
16,984 SIZES**

Reduces "Specials" . . . Speeds Delivery . . . Cuts Costs

Only Acme offers two bushing standards giving you 9,870 EXTRA thin wall sizes... sizes now costing you premium prices elsewhere and delaying your production. Write for catalog.



Beaver STANDARD ARBORS
AND ADAPTORS CUT DOWN -TIME
LOSS—ASSURE ACCURACY FOR YOUR
CUTTING TOOLS!



The finest economy in the purchase of arbors and adaptors is quality.

Beaver Standard Tools are made to unusually high standards of quality. No stinting is permitted on workmanship or materials. Beaver Standard Tools are made with the same care and accuracy as precision aircraft parts . . .

hard, and wear resistant, on the surface but with a strong, tough core.

Remember, an extra set of arbors and adaptors is cheap insurance against loss from down-time in case of emergency.

You'll do a better job with less investment with Beaver Standard Tooling—try it, you'll like it too.

Beaver TOOL AND ENGINEERING
CORPORATION

2850 ROCHESTER ROAD • BOX 429, ROYAL OAK, MICHIGAN





(Left to right) A. H. d'Arcambal, C. W. Deeds, and R. W. Banfield

A. H. d'Arcambal Elected President of Niles-Bement-Pond Company

At the organizational meeting of the board of directors held recently, Alexander H. d'Arcambal was elected president of Niles-Bement-Pond Co., West Hartford, Conn. Mr. d'Arcambal had been acting general manager since the sudden death of Frederick U. Conard on March 14, 1954.

Charles W. Deeds, former president from 1943 to 1947, was elected chairman of the board of directors, and Richard W. Banfield was named to the newly-created position of executive vice president. All the other officials were re-elected.

At the annual meeting of the stockholders held in Flemington, New Jersey, the vacancy on the board of directors created by Mr. Conard's death was filled by the election of Sidney A. Stewart. On March 11, Mr. Conard had announced the election of Mr. Stewart to be a vice president and

ROOFE Heavy Duty Guarantee BULL NOSE Perfect CENTERS Alignment

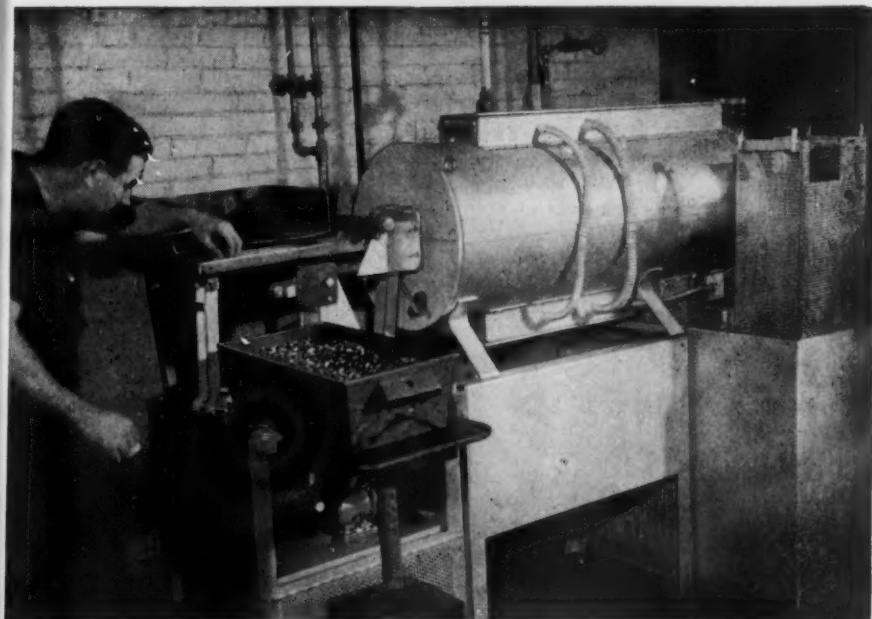
Two double rows of ball bearings in the large and small ends of this Bull Nose Center mean perfect alignment on any type of work.



Two shank sizes provide diameters from $\frac{1}{2}$ " to $7\frac{1}{2}$ " for a variety of work with a single center. Write for catalog.

Distributors Wanted.

HOUSTON GRINDING & MFG., CO., Inc.
2110 QUITMAN STREET • HOUSTON 10, TEXAS



RAYMOND MFG. CO.

"Bright" Hardens Precision Springs in a HEVI DUTY SHAKER HEARTH FURNACE

"We bright harden carbon, vanadium, and stainless steel springs without distortion in our Hevi Duty Shaker Hearth Furnace," says the Raymond Mfg. Co. of Corry, Pennsylvania.

Hevi Duty standard Shaker Hearth Furnaces will carburize, nitride, dry cyanide or bright harden up to 150 lbs. of small parts per hour. Operation of this production machine is semi-automatic.

Write for bulletin HD-850 today.



HEVI DUTY ELECTRIC COMPANY

MILWAUKEE 1, WISCONSIN

Heat Treating Furnaces... Electric Exclusively
Dry Type Transformers Constant Current Regulators

manager of the Chandler-Evans Division of the company.

Mr. d'Arcambal has been with the company 35 years, starting as metallurgist in the Pratt & Whitney Division. In 1927, he was appointed sales manager of the Cutting Tool and Gage Division; and in 1941, he was elected vice president. He assumed the additional responsibilities of general sales manager and was elected a director

in 1950. Mr. Banfield entered the employ of the company in 1935 as a special apprentice. He was appointed assistant secretary in 1937; secretary in 1943; and secretary-treasurer on the retirement of the late E. L. Morgan in 1945. Mr. Banfield became a director of the company in 1947. In 1953, he was elected a vice president and subsequently named manager of the Pratt & Whitney Cutting Tool and Gage Divisions, a post which he continues to fill.



COLLET EQUIPMENT

Use-Em-Up Type Drill Sleeves
Use-Em-Up Type Drill Sockets
Standard Type Drill Sleeves
Standard Type Drill Sockets
Short Shank Type Sleeves
Short Shank Type Sockets
B. & S. Taper to B. & S. Taper Sleeves
B. & S. Taper to Standard Taper Sleeves
Standard Taper to B. & S. Taper Sleeves
Rough Shank Sockets
Solid Type Sockets
Morse Taper Shank Tap Sockets
Standard Spot Facing Cutter Bars
High Speed Point Lathe Centers
Carbon Steel Lathe Centers
Pipe Centers for Lathes
Lathe Bushings
Blank End Arbors
Chuck Arbors
Drill Drifts
Magic Type Chucks and Collets

Standard tools for all drilling, reaming, and tapping needs and special tools to order. Immediate attention to regular or special requirements.

THE COLLIS COMPANY
CLINTON, IOWA

Dept. A

Ex-Cell-O Corporation Forms Subsidiary in England

At the annual meeting of shareholders of Ex-Cell-O Corp., Detroit, Mich., H. G. Bixby, president, announced that the corporation had formed a new, wholly-owned subsidiary, known as Ex-Cell-O Corporation (Machine Tools) Limited and located in England. The new subsidiary has acquired all of the assets, including land, buildings, machinery, equipment and inventory, of Alfred Bray & Sons, Ltd., Leicester, England. It is intended that the English subsidiary will commence to manufacture some of the machine tool lines now being produced by Ex-Cell-O in the United States. E. J. Townsend has been appointed managing director of the new subsidiary. Previously, Mr. Townsend was director in charge of sales for A. A. Jones & Shipman, Limited.



DRILL THESE HOLES
BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Pa.



Circle R — CIRCOLOY — Saws

**do jobs too tough for HSS,
not tough enough for Carbide**

New CIRCOLOY Combines Advantages of other steels in general use

Fills the performance gap between carbide and high speed steels — lets you restrict use of carbide and HSS to uses they serve best.

Suited for tougher work but can be used for regular cutting jobs — because it outlasts HSS.

Longer life, longer production runs, superior cutting, does operations efficiently that HSS cannot handle satisfactorily.

Unlike carbide, needs no special handling — can be reground on any standard grinding apparatus.

New to market, but proved efficient and economical in production tests for over 1 year in plants all around the country.

Circoloy metal cutting saws, thickness $\frac{1}{16}$ " to $\frac{1}{4}$ ", now offered in same line as our regular HSS circular cutting tools.

Developed through 30 years of experience producing the best available tools of high speed steel, solid tungsten carbide, carbide tipped.

**Get Prices
and details from
CIRCLE R.
SPECIALISTS IN . . .**

BURBANK	DETROIT	MONTREAL	PITTSBURGH
CHICAGO	GREENVILLE	NEW YORK CITY	PROVIDENCE
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DALLAS	KANSAS CITY	PHOENIX	ST. LOUIS
DAYTON			

METAL SLITTING SAWS
COPPER SLITTING SAWS
SCREW SLOTTING SAWS
COMMUTATOR SLOTTING SAWS
JEWELER'S SLOTTING SAWS
TUBE CUT OFF SAWS
SLITTING DISCS • SOLID &
TIPPED TUNGSTEN CARBIDE
SAWS • COMBINED DRILLS,
COUNTERSINKS & CENTER
REAMERS

CIRCULAR TOOL CO., INC.

PROVIDENCE 5, RHODE ISLAND



*Specialists in
Circular-Cutting Tools Since 1922*

Hy-Pro Tool Announces Transparent Package for Taps

The Hy-Pro Tool Co., New Bedford, Mass., has announced a transparent package for its taps. The plastic packages, it is claimed, have been designed specifically to combine maximum strength with immediate visible identification.

The new package is intended to cut costs by providing fast inventory

counts, quick size and thread checks, minimum storage space and 80 per cent lighter weight for shipping.

New Britain Machine Announces Changes in Officers

The announcement of important changes and promotions among officers of The New Britain Machine Co., New Britain, Conn., was made recently by Chairman Herbert H. Pease, following the annual meeting of the board of directors. Robert T. Frisbie, president, has become chair-

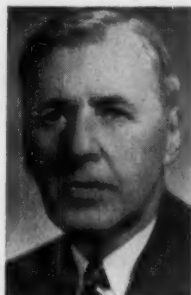
LEVIN[®] MICRO-DRILL PRESS FOR VERY SMALL HOLES DOWN TO .002"



Designed to hold small drills in precision collets, thus overcoming the difficulty of making a drill run true as when held in a conventional drill chuck. Absence of a sliding quill guarantees maximum sensitivity with fingertip control. A mounted $\frac{1}{8}$ " capacity chuck can also be used.

Send for Catalog L describing Micro-Drill Press, full range of collet sizes, accessories and other precision tools

LOUIS LEVIN & SON, INC., 3610 South Broadway, Los Angeles 7, Calif.



Ralph S. Howe

man of the executive committee of the board, and Ralph S. Howe, executive vice president, has been named president. Julian C. Pease, a vice president, became executive vice president and will continue as general manager of the New Britain-Gridley Machine Division of the

Precise
hole location,
easy contour
inspection
with new
machine tool
microscope



- Wide field of view ($\frac{1}{4}$ "); 30x magnification
- Gages accurately to .0001—at a glance
- Mounts on offset bracket, or directly in the spindle
- Fits nearly any machine tool
- Image always appears erect and true
- Ideal for checking slots, contours, surface conditions, or transferring hole locations from template to workpiece.

Write today for complete details.

THE PERKIN-ELMER CORPORATION

Norwalk, Connecticut

MORE PARTS
PER HOUR
with

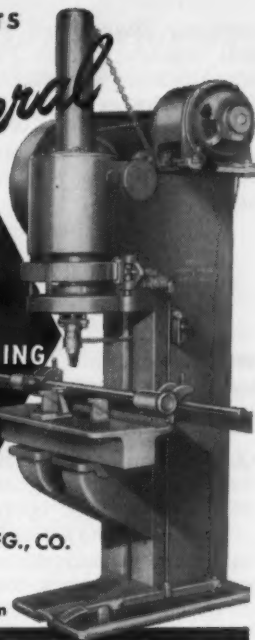
General

FLEXIBLE-
POWER
STRAIGHTENING
PRESSES

Let Us
Prove It!

General MFG., CO.

6433 Farnsworth
Detroit 11, Michigan

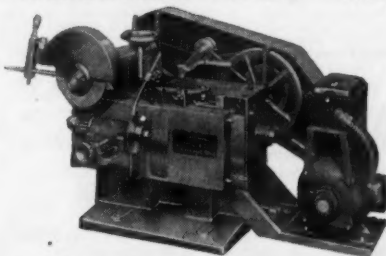


Reduce Maintenance Costs

with this

Automatic Metal Saw Grinder

Wardwell's "35 T" will sharpen up to 115 saws
.015 thick at one time . . .



This includes slitting and screw slotting saws and milling cutters. Takes saws from 2" to 5½" diameter. Completely automatic. No attention is required after machine is started. These ingenious, compact and sturdy grinders are saving and making money for their owners all over the world.

You owe it to yourself to write for
Bulletin 35 T containing full information.



WARDWELL

MANUFACTURING CO.

3803 Ridge Road, CLEVELAND 9, OHIO

Maker of largest line of saw and tool sharpening machines

company. Clarence E. Bachman, general manager of the Precision Products Division, was elected a vice president in charge of the Products Division, and George G. Wilcox, manager of the Hand Tool Division, was named vice president in charge of that division.

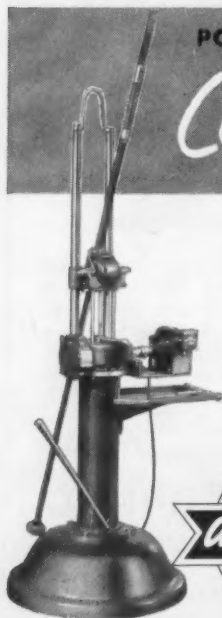
Bliss Acquires Rights to "Weld-a-Matic" Splicer

E. W. Bliss Co., Rolling Mill Division, Salem, Ohio, has announced that it has acquired the manufacturing rights to the "Weld-a-Matic" Splicer from the dissolved Arms-Franklin Corporation. The agreement transfers to Bliss patent rights, engineering drawings, service, operating and empirical data. The splicer has many uses in the metal industry, including the splicing of ferrous and non-ferrous strip, continuous feeding of skelp in light-walled pipe manufacture, re-

uniting silicon sheets into continuous strands and coils, and so on. The principle involved permits the butt welding by shielded arc method of low, medium and high-carbon steel strip, stainless strip in both the straight chrome and nickel-chrome series, silicon strip, copper and copper-base alloys. Aluminum splicing has also been perfected in certain grades.

J. P. Crosby Elected President of A.S.T.E.

Joseph P. Crosby, vice president and a director of LaPointe Machine Tool Co., Hudson, Mass., has been elected president of the American Society of Tool Engineers for the coming year, succeeding Roger F. Waindle, consulting engineer in Muskegon, Michigan. Dr. H. B. Osborn, Jr., technical director, "Tocco" Division, Ohio Crankshaft Co., Cleveland, Ohio, was named first vice president; H. C. McMillen, plant



POWER SCRAPER

Cuts Production Costs...

... 5 HOUR JOB CUT TO 50 MINUTES

One manufacturer was scraping flat pieces measuring 18 by 24 inches... each piece requiring 5 hours to scrape by hand. An Anderson Power Scraper cut scraping time to 50 minutes! That meant a substantial saving in production costs and another happy Anderson customer. Let us help you estimate how much this portable, easy-to-use power scraper will save for you.

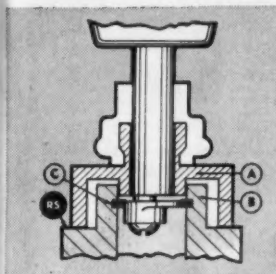
Today, Write for Bulletin 6-22

Anderson

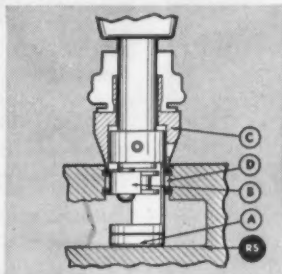
ANDERSON BROS. MFG. CO., Rockford, Ill.

Waldes Truarc Grooving Tool Out-Performs Conventional Recessing Tools

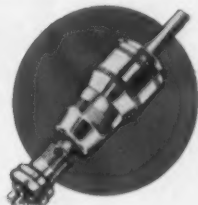
SAVES TIME! CUTS COSTS! NEEDS NO SKILLED LABOR!



Clearing Obstructions or Protrusions - Waldes Truarc Grooving Tool with special bushing with high shoulder A in order to clear obstruction B on reference surface RS so groove can be properly located in bore.

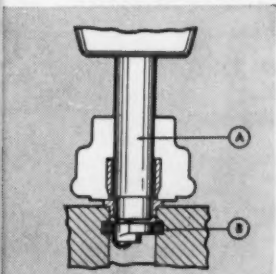


Locating Grooves from Bottom of Hole or Blind Hole - Use of bottom adaptor A and double cutter B. Bushing C pilots tool into bore D while bottom adaptor acts as stop to locate grooves from reference surfaces RS below bore.

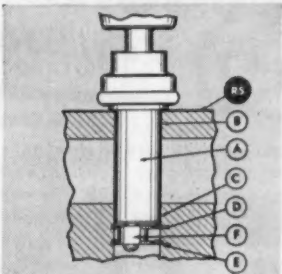


AMAZINGLY VERSATILE!

The Waldes Truarc Grooving Tool adapts quickly and simply to your toughest recessing requirements. With it, even *unskilled labor* can perform high precision, mass production operations.



Small Diameter Bore - Need for Wide Groove - Great versatility of tools allows A-2 Tool to accept stepped down spindle and cuttershaft assembly A. Provides cutting capacity in a bore normally within the range of smaller A-1 Tool. Illustrated, larger tool capacity necessary to cut groove diameter B exceeding normal capacity of standard A-1 Tool.



Extending Reach of Tool - Waldes Truarc Grooving Tool assembled with extended bushing A increases normal range of tool in order to reach proper groove location in bore. Bushing also registers on reference surface RS of workpiece while piloting tool at two points B and C inside bore. Two grooves D and E are cut simultaneously with double cutter F.

WIDE CUTTING RANGE!

The Waldes Truarc Grooving Tool comes in five models: A-1, A-2, A-3, B and C. This wide variety of models enables you to cut accurate grooves in housings with diameters from .250 to 5.000 inches. Special features, modifications and adaptations allow each model to operate efficiently under many varying conditions.

SEND YOUR PROBLEM TO WALDES!

Whatever your internal grooving problem, send us your blueprints and let Waldes Truarc engineers give you a complete analysis, price quotation and delivery information on the most economical tool set-up for your particular job.

WRITE NOW FOR 20-PAGE TECHNICAL MANUAL
CONTAINING FULL ENGINEERING DATA



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Reg. U.S. Pat. Off.
GROOVING TOOL

MADE BY THE
MANUFACTURERS OF WALDES TRUARC RETAINING RINGS

WALDES KOHINOOR, INC., 47-16 Austel Pl., L.I.C. 1, N.Y.
Waldes Truarc Grooving Tool mfd. under U.S. Pat. 2,411,426



Waldes Kohinoor, Inc., 47-16 Austel Place
Long Island City 1, New York

Please send me your new 20-page technical manual on the Waldes Truarc Grooving Tool.

Name

Title

Company

Business Address

City Zone State

manager, Philco Corp., Bedford, Ind., was elected second vice president; and H. E. Collins, manager, Process Engineering Department, Hughes Tool Co., Houston, Texas, appointed third vice president. R. C. W. Peterson, president and owner, Peterson Engineering Co., Toledo, Ohio, was elected treasurer; Wayne Ewing, partner, Arrowsmith Tool & Die Co., Los Angeles, Calif., was named secretary; and Harold D. Long, president, Scully-Jones & Co.,

Chicago, Ill., was appointed to serve as assistant secretary-treasurer of the society.

New directors elected include A. B. Clark, technical consultant, Haynes-Stellite Co., Cleveland, Ohio; C. M. Smillie, president, C. M. Smillie & Co., Detroit, Mich.; J. O. Horne, J. O. Horne & Co., Rochester, N. Y.; Mr. Long; and Mr. Ewing. Re-elected to the board of directors were Willis Ehrhardt, managing partner, Ehrhardt Tool & Machine Co., St. Louis Mo.; J. A. Goodwin, chief process engineer, Master Electric Co., Dayton, Ohio; B. J. Hazewinkel, presi-



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NOBUR Tools turn a slow bench operation into fast and efficient machine work! Remove burrs on multi-walled parts with a smooth, clean cutting action that won't mar highly finished surfaces. Eliminate rejects from slow, costly hand work with files, scrapers and abrasives.

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Nobur Tools cut freely on either hard or soft metals, are simple in construction and are made in sizes to cover a full range of hole diameters. *NEW "DS" SERIES extends range of NOBUR applications to holes as small as 1/16" diameter. **WRITE FOR FULL DETAILS TODAY!**



Joseph P. Crosby

dent, Daily Grinding, Inc., Los Angeles, Calif.; G. A. Rogers, sales engineer, Rudel Machinery Co., Ltd., Montreal, Canada; R. A. Smith, chief tool engineer, Pratt & Whitney Division, Hartford, Conn.; Mr. Crosby; Mr. Collins; Mr. McMillen, and Mr. Osborn.

Parts like these quickly de-burred with



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NOBUR MANUFACTURING COMPANY

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CAMS

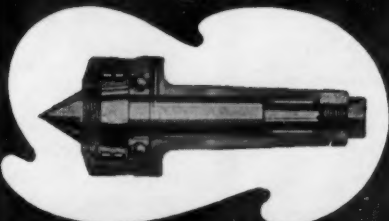
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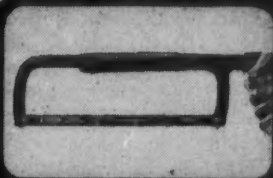


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type ball and roller bearings assure
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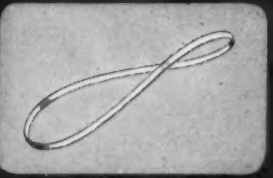
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Frames, Metal and Wood Cutting Band Saws.

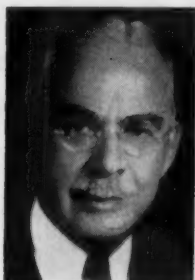
Fifth Annual Montreal Industrial Tool and Equipment Show

The Fifth Annual Montreal Industrial Tool and Equipment Show, under the auspices of the Foremen's Club of Montreal, is scheduled to be held November 8th to the 12th, 1954. The show will be of a national character with direct appeal particularly to that part of Eastern Canada, including Quebec, the Maritimes and Eastern Ontario, of which Montreal is the main center. The object of the show is to exhibit the latest in industrial equipment of

all kinds, such as tools, maintenance, welding and materials handling. Attendance will be by invitation to plant executives and engineers. E. M. Wilcox is manager of the show, with offices at 4785 Sherbrooke St., W., Montreal, and 19 Melinda St., Toronto.

G. N. Jeppson Receives Isaiah Thomas Award

At a banquet attended by 500 New England business and industrial leaders, George N. Jeppson, chairman of the board, Norton Co., Worcester, Mass., recently received the fifth annual Isaiah Thomas Award



George N. Jeppson

for distinguished community service from the Advertising Club of Worcester. The award, established in 1950, recognizes "citizens whose personal efforts and accomplishments have made Worcester a better community in

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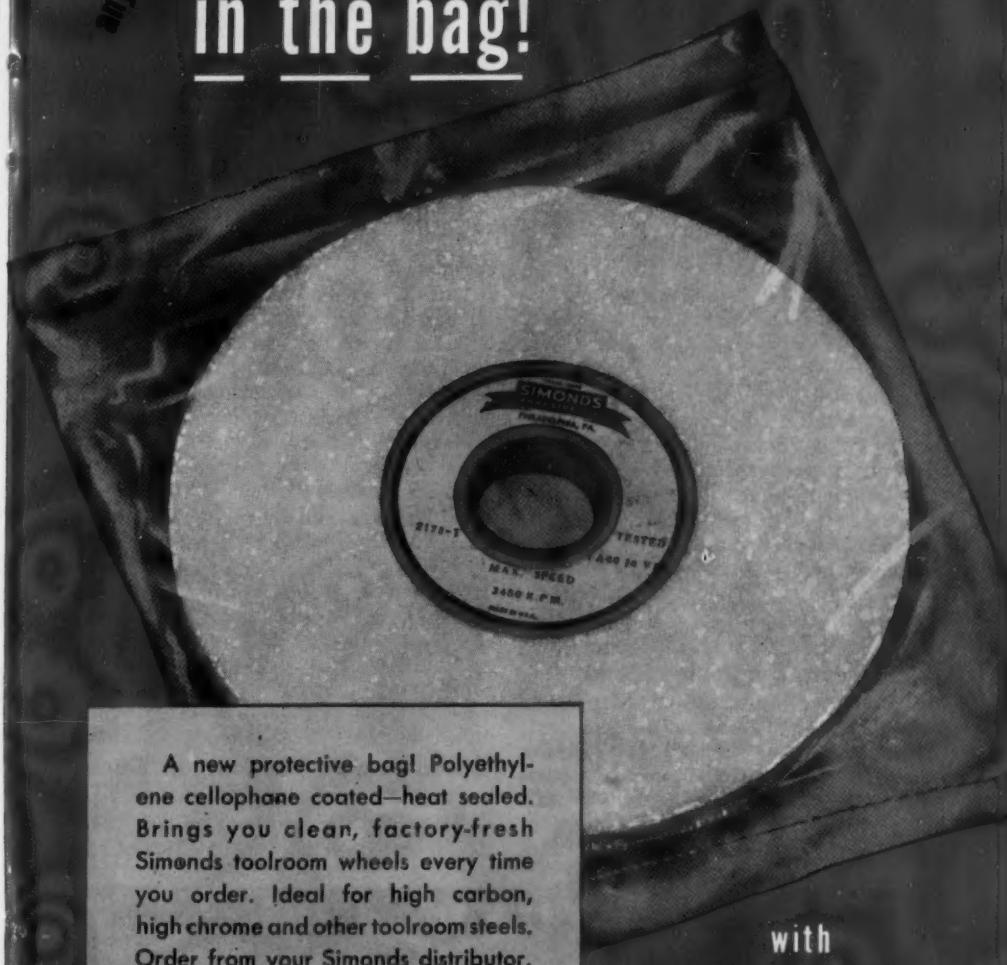
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A new protective bag! Polyethylene cellophane coated—heat sealed. Brings you clean, factory-fresh Simonds toolroom wheels every time you order. Ideal for high carbon, high chrome and other toolroom steels. Order from your Simonds distributor.

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(Left to right) T. D. VanderVoort, C. B. Noelting, C. T. Jordan, S. H. Cross and D. C. Swander, Jr.

which to live, to do business and to enjoy living." Mr. Jeppson, an active 81 years of age, has been identified with Worcester industry, charities, finance and civic affairs for more than 60 years.

Dr. Alfred C. Neal, first vice president of the Federal Reserve Bank of Boston, was the principal speaker at the banquet. Franz L. Steiner, president of the Advertising Club, presented the award, a miniature of Isaiah Thomas' first printing press.

A.S.M.M.A. Elects Officers and Executive Committee Members

The American Supply & Machinery Manufacturers' Association, Inc., Pittsburgh, Pa., has announced the election of officers and executive committee members for the coming year. The officers elected were T. D. VanderVoort, Clemson Brothers, Inc., Mid-

dletown, N. Y., president; Clarence B. Noelting, Faultless Caster Corp., Evansville, Ind., first vice president; Charles T. Jordan, The Charles Parker Co., Meriden, Conn., second vice president; S. H. Cross, Stanley Electric Tools, New Britain, Conn., secretary; and Dan C. Swander, The Columbian Vise & Mfg. Co., Cleveland, Ohio, treasurer. Elected for a three-year term on the executive committee were Paul A. Johnson, Jr., R. D. Mount, F. J. O'Laughlin and James Y. Scott. Horace Armstrong was elected for a two-year term and George S. Case, Jr., was appointed for a one-year term on the executive committee.

Metal Powder Association Elects Officers and Directors

Marking the celebration of their tenth anniversary, the members of the

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ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by

J. MILTON LUERS, 12 Pine Street, Mt. Clemens, Mich.

Produced under License Issued by John Milton Luers Parents Inc.

Metal Powder Association recently elected officers and directors for 1954-55 at a meeting held in Chicago. Paul E. Weingart, American Metal Company Ltd., was elected president, succeeding T. R. Moore, assistant to the vice president of General Dyestuff Corporation; William E. Cairnes, president, Radio Cores, Inc., a vice president of the association and head of the Electronic Core Division, was named chairman of the board; Robert L. Ziegfeld was re-elected secretary-treasurer; Morris Boorky, president, The Pressmet Company, was appointed head of the Fabricators Division and vice president of the association; and Paul Weingart was elected head of the Powder Producers Division.

Carl Johnson, vice president, The Pressmet Company, and Ralph B. Quelos, general sales manager, Chemicals-Pigments-Metal Division, Glidden Company, were both elected directors. The balance of the board of directors consists of George Roberts, vice president, Vanadium Alloys Steel Company; Fred Lux, president, Lux Clock Manufacturing Company; B. T. duPont, sales manager, Plastics Metals Division, National Radiator Company; and Harrison Stackpole, vice president, Stackpole Carbon Company.

Micromatic Hone Celebrates 25th Anniversary

Kirke W. Conner, president of Micromatic Hone Corp., Detroit, Mich., addressed employees at the company's recent 25th anniversary celebration. Mr. Conner cited Micromatic's growth from six employees and net worth of \$78,000 in 1929 to over 700 employees and net worth in excess of \$4.25 million today. Mr. Conner, himself a 25-year man, awarded gold watches or service pins to 72 employees.



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- **LOW PRICES**

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50,000 R.P.M.
Weight 12 ounces; length 6¾ inches; chuck size ½ inch. Wheel guard removed for better illustration.

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The RPM's stay up while grinding... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind... not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work... longer wheel life.

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Write for KIPP Air Tool Catalog at 3006

new shop equipment

Surface Grinder Utilizes Hydraulic Feed and Cross Traveling Head

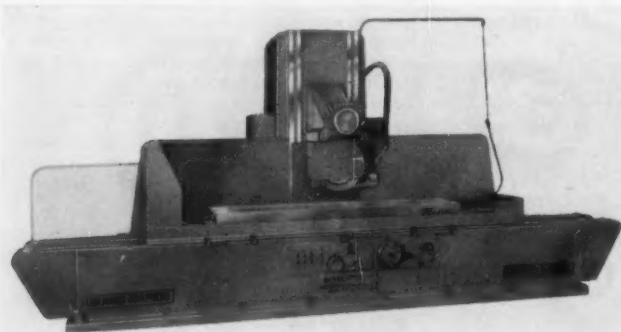
Gallmeyer & Livingston Co., 408 Straight Ave., Grand Rapids, Mich., has announced the Grand Rapids High-Speed Production-Type Surface Grinder which utilizes hydraulic feed and a cross traveling head. The spindle is powered by a 30-h.p. motor, providing 6,000 s.f.p.m. speed with a 20-in. diameter wheel. The hydraulic drive motor is rated at 15 h.p. The base is a rugged one-piece casting, and the upright column, which carries the vertically-traveling head, is also a one-piece casting for maximum rigidity. The table speed is variable from practically 0 to 150 ft. per minute.

The machine utilizes a one-shot lu-

brication system, and the conveniently located control panel features oil-proof push buttons. A hydraulic oil reservoir is located outside of the machine for convenience with no sacrifice of floor space. A self-contained motor-driven coolant system is supplied as standard equipment. The machine measures 24 x 25 x 96 inches. Many accessories are available for the machine, including a built-in diamond wheel truing device, magnetic chucks and automatic down feed.

Two Point Press Has Double-Geared Twin Drive

The Cleveland Punch & Shear Works Co., E. 40th & St. Clair Ave., Cleveland 14, Ohio, has announced a two point press which has a double-geared twin drive and which is equipped with an electrically controlled, air oper-



Grand Rapids High-Speed Production-Type Surface Grinder

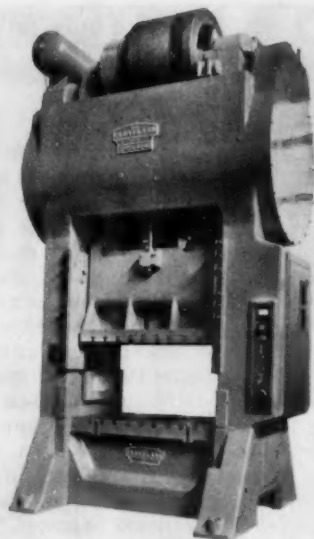


Illustration showing front view of Cleveland Two Point Press

x 60-in. bed and slide area. The press operates at from 20 to 40 r.p.m. and has a capacity of 350 tons.

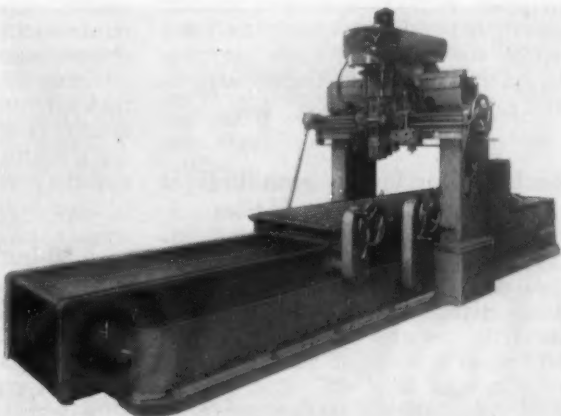
Machine Mills and Profiles Irregular-Shaped, Complicated Precision Parts

Morey Machinery Co., Inc., 383 Lafayette St., New York 3, N. Y., has announced the No. 50M "Aeroframe" Profile Milling Machine which is designed for milling and profiling irregular-shaped, complicated precision parts, such as air frames, cast iron forgings for computing, type setting and printing machines, forgings for aircraft parts and many others. According to the manufacturer, the machine can be used not only for mass production, but for the machining of single pieces as well. Having a range of speeds from 125 to 4,600 r.p.m., the machine is said to be capable of machining practically any material.

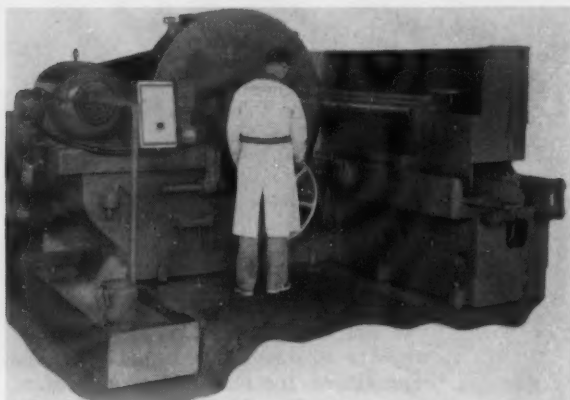
The spindle is built for power and is provided with a No. 50 standard taper. The cross rail and bed have re-

ated, drum-type friction clutch with a spring-loaded brake. The flywheel is also provided with an auxiliary air brake which brings the flywheel to a quick stop when the power is shut off. The slide of the press is counterbalanced by air, and the press is arranged with two safety blocks which are used when the dies are being set. The blocks are provided with safety plugs so that when they are pulled out, the control circuit is made inoperative. The die area is lighted from both sides by lights placed in the inside of the uprights.

The press has a stroke of 8 in., a 6-in. adjustment; a 26-in. distance from the bed to the slide with the stroke down and adjustment up; and a 42



Morey No. 50M "Aeroframe" Profile Milling Machine



Hanchett "Big 60" Hogger Knife and Shear Blade Grinder in use

placeable hardened steel ways, and the table and upper carriage carrying the spindle are mounted on roller bearings. All ways on the table, as well as on the cross rail, are protected from chips by endless belts. Automatic lubrication is provided to the spindle bearings and upper carriage, with a one shot lubrication system for table bearings. The machine is equipped with adjustable stops for the table, upper carriage carrying the spindle, and for the depth control of the spindle. The distance between the centerline of the spindle and the follow up pin is also adjustable. The machine can be equipped with a special hydraulic power feed unit actuating the table and/or the upper carriage carrying the spindle, as well as tracing attachments.

Machine Grinds Bevels on Straight Knives and Shear Blades

Designated as the "Big 60," a machine for grinding the bevels on all types of straight knives and shear blades, particularly chipper, hog and barker knives and all types of heavy-duty shear blades, has been developed by Hanchett Mfg. Co., Big Rapids, Mich. According to the manufacturer,

the machine affords unusually heavy cuts at a high rate of table travel, using a large volume of coolant on the workpiece, thus making it possible to grind knives and shear blades with no burning or heat generation. The machine features a 60-in. diameter segmental

grinding wheel with a 5-in. diameter precision-ground grinding wheel spindle mounted in extra heavy-duty preloaded precision bearings. The automatic infeed of the grinding wheel is of unique design and incorporates a hydraulic cam actuated control mechanism, with graduated dial, in increments of 0.0005 inch. In addition to the automatic infeed, the machine has a large manually-operated handwheel which makes the infeed a dual controlled unit.

The knife bar is mounted on top of a rugged heavy-duty table which is hydraulically operated, with table travel speeds ranging from 10 to 100 ft. per minute with fingertip control. The machine is equipped with a motor for the grinding wheel head assembly, recommended from 30 up to 100 h.p. The spindle is driven through sheaves, using a multiple of six large V-belts for positive drive operation.

30-Inch Grinder Features Vibrationless Operation

The Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio, has announced a 30-in. single wheel wet tool grinder which is said to feature vibrationless operation. A two-

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More will be *profit* with a SHELDON

It actually costs less to do most turning jobs on a Sheldon Precision Lathe. Machine-tool investment is cut to a fraction. Power cost is materially reduced. Less experienced operators can operate Sheldons safely and efficiently. Even cost-loadings for plant—floor space, heat and light are lower because two Sheldons can often operate in the space occupied by one large lathe.

On most "everyday" jobs a Sheldon will actually turn out more

pieces per hour too. With double V-belts to the spindle Sheldon lathes deliver enough power to take a healthy bite in direct drive, at really high speeds. Sheldon's "Zero Precision" Taper Roller Bearings permit work to the closest tolerances. Very seldom if ever are such extremely accurate bearings used in other lathes.

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▼ For real savings, SUPEREAM STUB REAMERS are suited exactly to your specifications in both standard and decimal sizes060 to .501 in stock. Other sizes ground in 3-4 days.

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ROUTE 176 and BRADLEY ROAD
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speed multiple V-belt drive from a 5-h.p. motor to the grinding spindle is versatile and efficient, and a safety interlock prevents overspeeding of the grinding wheel. The heavy grinding spindle is accurately machined and ground to size, and ball bearings are fully protected. The machine utilizes a large-size oil reservoir which has a visual gage. The wheel is protected by a structural plate steel guard, which is adjustable for wheel wear, and plate steel wheel flanges. The splash pan supports a 10-in. square work table



Standard 30-Inch Single Wheel Wet Tool
Grinder

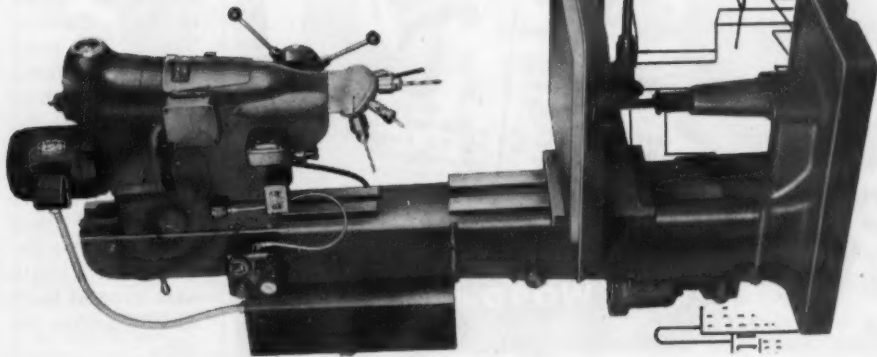
which has a groove in the top for vernier gage use and reversible wear plates that are renewable.

The coolant system of the machine includes a built-in reservoir and settling chamber (both with clean-out drains), adjustable nozzle and coolant control valve. For maintenance convenience, a large opening at the rear of the machine provides access to the ball-bearing motor and self-priming coolant pump. The grinder is also available in 12, 14, 16, 18, 20 and 24-in. wheel sizes.

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The HOWE & FANT Turret Drilling Machine is a revolutionary development that does for drilling what the modern turret lathe does for turning.

FASTER. One operator performs up to six different drilling and tapping operations, in any sequence, at a single station. No time is lost moving work from one station to another. Speeds, depths, and reversals for tapping are all pre-set, and require no attention during successive operating cycles.

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LOWER COST. All this is yours in a half-inch capacity machine that takes only 34 by 50 inches of floor space . . . at a basic cost of \$2950.

HOWE & FANT, INC.

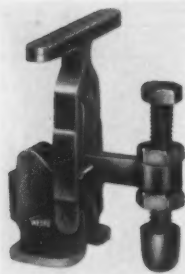
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Toggle Clamp Is Available in 35 Sizes

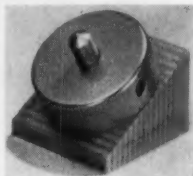
West Point
Mfg. Co., 26939
W. 7 Mile Rd.,
Detroit 19, Mich.,
has announced a
toggle clamp
which is avail-
able in over 35
sizes. Hardened
steel bushings

and pins minimize the wear at bearing points, providing long life and easy, fast action. The clamp is designed for light, medium and heavy pressure loads ranging from 80 to 1,600 pounds.

Magnetic Diamond Holder

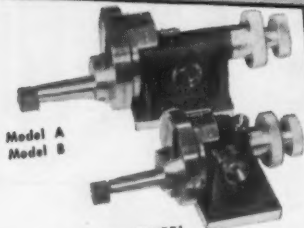
A magnetic diamond holder which is said to offer a quick and easy way of self-sharpening the diamond point by means of rotation by handling has been announced by Anton Machine

Works, 1226
Flushing Ave.,
Brooklyn 37, N.
Y. According to
the manufactur-
er, the replace-



Anton Magnetic Dia-
mond Holder

Improve Your Operating Efficiency, Quality and Profits with these LAST WORD Metal-Working Products!



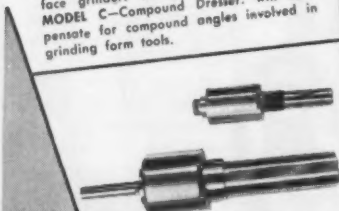
Model A
Model B

**LAST WORD WHEEL
DRESSERS FOR RADIUS
AND TANGENT ANGLE
DRESSING — AVAILABLE IN 3 MODELS**
MODEL A—For grinders using wheels up to
20" dia MODEL B—For small model sur-
face grinders with 7" max wheel dia
MODEL C—Compound Dresser. will com-
pensate for compound angles involved in
grinding form tools.

Model C



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Can be supplied with stand-
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**GRAY-GRIMES
AUTOMATIC STEADY-REST
FOR O. D. GRINDING**—Per-
mits grinding complete length
of shaft maintaining constant
pressure against work-
piece as stock is
removed.

Mfg'd by
Gray-Grimes Tool Co.



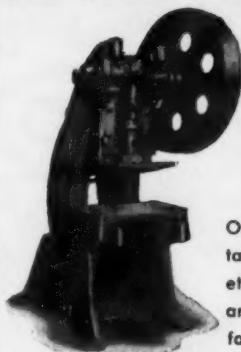
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diamond tool can
be easily and
quickly accom-
plished by loosening a set screw on the diamond holder. The holder utilizes a laminated base which can be used for grinding practically any angle.

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The Model No. 7F is the Strongest and Largest Name Plate and Parts Stamping Machine Made.

FAST for Numbering or Lettering in a Straight Line or True Curve.

DIE SIZES—

From
1/16"
To
3/8"

The **ACROMARK** Company

9 MORRELL ST., ELIZABETH 4, N. J.
"The Original Marking Specialists"

(Advertisement)

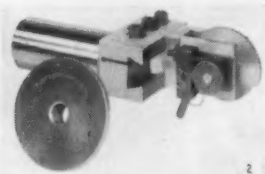
Screw Machine Attachment Eliminates Separate Marking Operations

Automatic die marking of part numbers, patent numbers, trade marks, etc., during the operating cycle of automatic and hand operated screw machines, bench and turret lathes, etc., on almost any surface of a part is possible with the complete line of automatic roll markers available from New Method Steel Stamps, Inc., 147 Joseph Campau, Detroit 7, Michigan.

Suitable for both light and heavy work, the markers are practically fool-proof and eliminate the need for separate setups for marking, thus reducing cost, scrap, etc. Quick interchangeable roll dies give remarkable versatility and reduce time for setup changeover.



1. Model 500-C for automatically marking on outside cylindrical surface of screw machine parts.

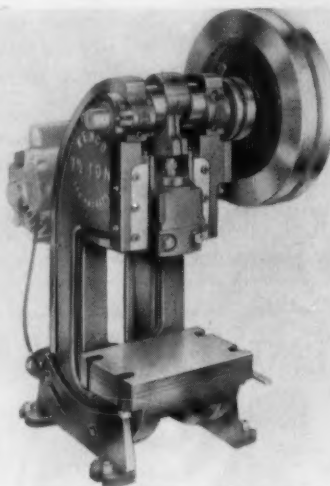


2. Model 600-E for marking on the end face of parts. Normally installed in tail-stock of a screw machine or similar position on other machines.

Illustrated are two of the three basic models of the cost cutting markers. Model 700 (not shown) is for marking and cutting off at the same time. The marker occupies the cutoff slide, leaving other stations open for machining operations. New Method also manufactures a complete line of hand stamps, inspectors' stamps, embossing dies, marking hammers, type and type holders, etc. Precision marking and engraving services available.

Power Press Has Capacity of 7½ Tons

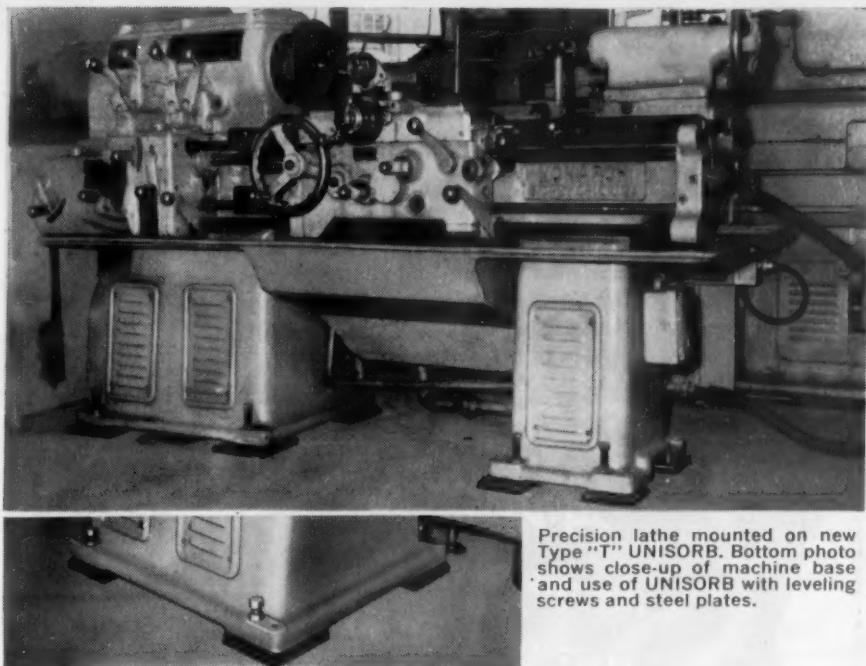
Designated as the Model 7, a power press with a 7½-ton capacity has been announced by Kenco Mfg. Co., 5211 Telegraph Rd., Los Angeles 22, Calif. The press incorporates a crankshaft made of solid, one-piece steel which is heat treated and precision ground and a 100-lb. flywheel mounted on two roller bearings. Special alloyed bronze, oversize bearings contain the crank-



Kenco Model 7 Power Press

shaft and the connecting rod. The 90-degree V-type ram and ram guide are oversize in length for precision. The frame of the press is of the trip-ribbed type to provide strength and rigidity, yet light in weight. According to the manufacturer, a single trip is standard equipment, but can be converted to continuous instantly by moving one lever.

The press has a 1½-in. standard stroke and a shut height of 7¾ in. to the bolster bed with the adjustment up and the ram down. The bolster plate measures 7½ x 11 x 1 in. thick.



Precision lathe mounted on new Type "T" UNISORB. Bottom photo shows close-up of machine base and use of UNISORB with leveling screws and steel plates.

NEW TYPE "T" **UNISORB**® MOUNTING PADS USED FOR PRECISION MACHINES...

For precision machines which must remain extremely level during operation, Type "T" UNISORB is now available. Like other types of UNISORB, this type reduces transmitted vibration and is used without bolting machines to the floor.

Condensed information about new Type "T" UNISORB Mounting Pads

Loading: carries loads of 75 to 125 lbs. per sq. in.

Thickness: $\frac{3}{8}$ " thick material with a greater density and firmness than other types of UNISORB.

Uses: include mounting of precision lathes, grinders, planers, jig borers, etc.

Resistant to petroleum products, mild acids and plant water conditions, Type "T" UNISORB provides a firm and durable mounting.

For the complete story about this new product and other types of UNISORB Mounting Pads, return the coupon today.

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"FELT FOR EVERY USE"

Offices: New York, Philadelphia, Chicago, Detroit, St. Louis

Sales Representative: San Francisco

Mills: Johnson City, New York; Millbury, Mass.; Jackson, Mich.; New York City

RETURN COUPON NOW! Please send information about Type "T" UNISORB and the booklet "Facts About Anchoring Your Machines with UNISORB".

Name.....Title.....
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Company.....

Address.....

City.....Zone.....State.....

Return to: The Felters Co., 219 South St., Boston 11, Mass

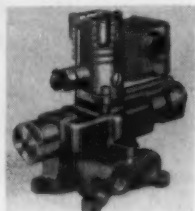
The press is open backed and inclinable, and all parts are said to be interchangeable.

Air Control Valve Has Non-Corrosive Parts

Designated as the "Speed King," a solenoid pilot operated air control valve which is said to feature non-corrosive parts has been announced by Valvair Corp., 987 Beardsley Ave.,

Akron 11, Ohio. The base is made of cast bronze, and the pilot valve is a zinc base alloy casting. All parts are totally enclosed, and the junction box for electrical control is cast integral with the housing of the pilot control unit. The pilot, it is claimed, can be mounted in two directions over the base and is universal to all assemblies. The stem and the plunger are the only moving parts.

The valve is designed to handle pressures ranging from 35 to 200 p.s.i. and is available for air or low pressure hydraulics. Two,



Valvair "Speed King" Solenoid Pilot Operated Air Control Valve

three, four and four-way, five-port (two pressure) models with pipe sizes from $\frac{1}{4}$ through 1 in. can be supplied. Foot or sub-base (manifold) mounting is optional in all sizes and models except the four-way five-port valve. According to the manufacturer, any voltage and cycle can be accommodated.

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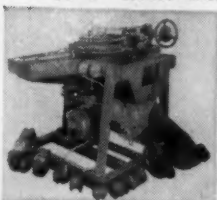
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American"

LINE OF COLD PIPE,
CONDUIT AND HEAVY
WALL TUBE BENDERS
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ONE OF 10 HAND-OPERATED TYPES
bending cold pipe from 1/4"
to 6" I.P.S. inclusive



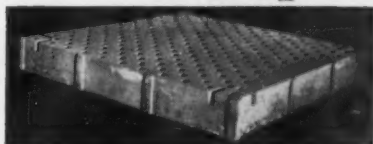
AMERICAN TYPE 2PBR

Designed for power application to our Type A-30 Hand Bender. Bends 1/2" to 2" Pipe at radii approx. 5 times pipe size, up to 180°. Complete, ready to run—no extras for standard machine. Min. radius bend—5 times pipe size. Max. radius bend—13". Complete with rolls for each pipe size. Standard motor equipment 2 H.P.

AMERICAN PIPE BENDING MACHINE CO., INC., 14 Furnace Street, Poultney, Vermont



Up to 2" —
Type A30



COMBINATION BENDING TABLES

For hot or cold bends of various shapes, pipes, bars, etc. 5' sq.; 7' sq. (3 1/2' x 7' pairs) suitable for welding together. Other sizes or custom made to your specifications.

Dependable MEASURING & CHECKING EQUIPMENT

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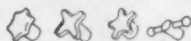
HAND WHEELS, KNOBS, HANDLES

Cadmium Plated

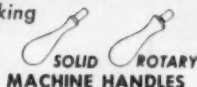
Non-rusting — good looking



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SOLID ROTARY
MACHINE HANDLES



MALLEABLE IRON

We also build jigs, fixtures, special tools and machinery. Send us your blueprints.



UNIVERSAL ANGLES

In 10 sizes, ranging from 4 x 3 3/4 x 5 and up.

BOX PARALLELS

In 15 sizes, ranging from 3 x 4 x 12 and up.

SLOTTED ANGLES

In 19 sizes, ranging from 4 x 9 x 5 and up.



SURFACE PLATES

Over 50 sizes, ranging from 7 x 7 1/2 to 96 x 192.

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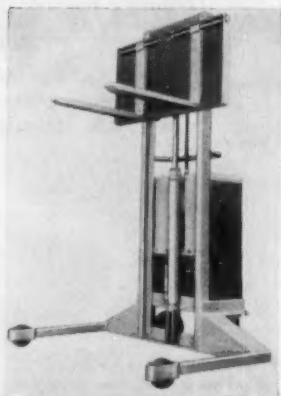
Dept. D

Detroit 12, Mich.

Unit Is Designed to Stack Palletized Loads

Economy Engineering Co., 4507 W. Lake St., Chicago 24, Ill., has announced the WL-F Worklifter which is a fork-type straddle-type unit designed to stack palletized loads. The unit is battery operated and features a hydraulic system of raising and lowering. Push-button controls, one for "up" and one for "down," are located at the end of a 12-ft. cord conveni-

ently held by a Reelite take-up cable for operation from the spot most convenient to the operator. According to



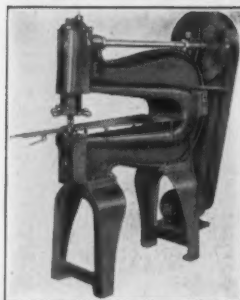
Economy WL-F Worklifter

... for more than
1001 jobs



HJORTH LATHE & TOOL CO.
8 BEACON STREET WOBURN, MASS.

SAVAGE NIBBLING MACHINES



CAPACITIES
UP TO
3/4"

—
ASK FOR
FREE BULLETIN
"J".
—

"NIBBLE YOUR COSTS"

FOR TUBE SLOTTING, TUBE SHAPING AND
FAST AND ACCURATE CUTTING OF FLAT
SHEETS BY TEMPLATE OR TO A SCRIBED LINE

W. J. SAVAGE COMPANY
Knoxville Since 1885 Tennessee

PIONEER MFRS. OF NIBBLING MACHINES

the manufacturer, raising and lowering is at 34 ft. per minute, and the platform may be stopped in any position safely by releasing the control button. The lifter is powered by two 6-volt 120-ampere batteries connected in series to provide 12 volt service.

Rated at 750 lb., the Worklifter is claimed to be capable of handling overloads up to 50 per cent. An automatic by-pass at 1200 lb. prevents excessive loading that may damage the mechanism structure. The unit utilizes two 8-in. diameter solid hard rubber swivel casters and two 5-in. diameter solid

READING BENCH KEYSEATER

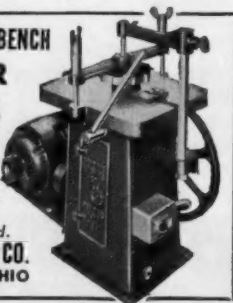
Portable—move directly to job; a time saver for both small and large shops.

3 3/4" stroke; adaptable for other work.

Low first cost — prompt delivery.

Good dealers wanted.

READING MACHINE CO.
CINCINNATI 37, OHIO



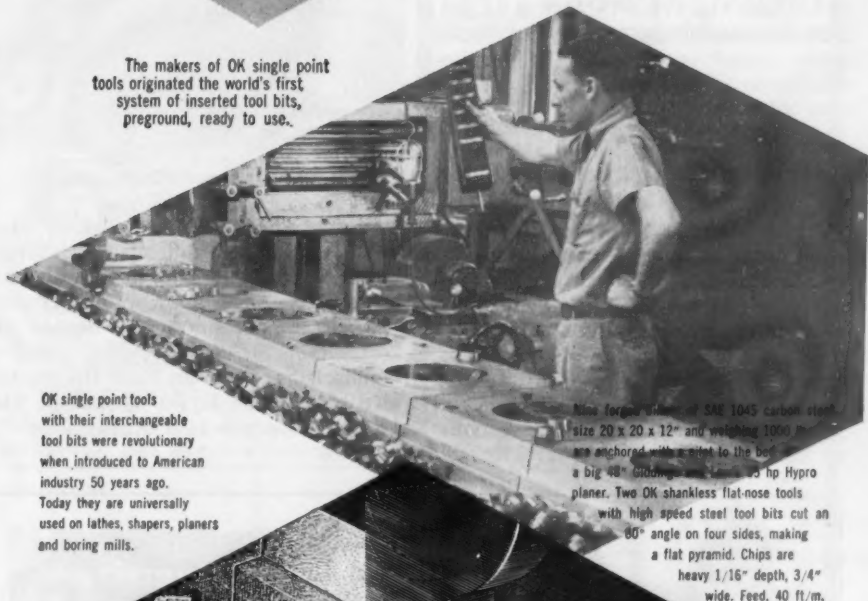
How Bullard
with two

Man-au-trol turret heads are gang-planed

OK

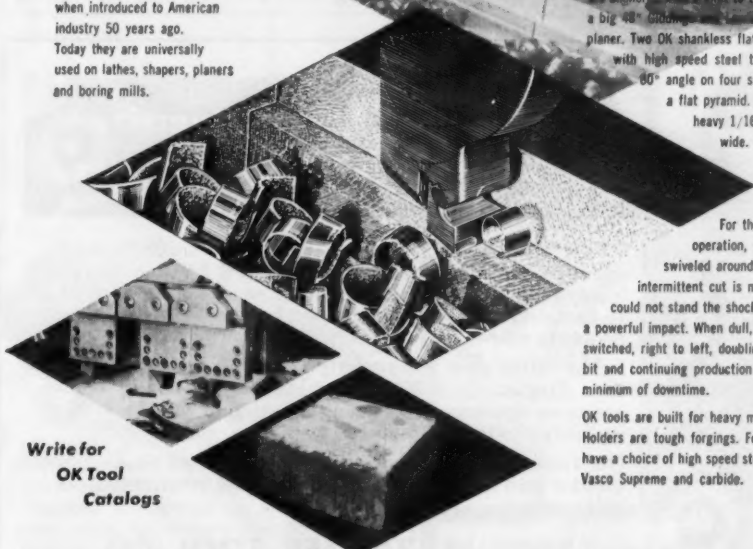
single point tools

The makers of OK single point tools originated the world's first system of inserted tool bits, preground, ready to use.



OK single point tools with their interchangeable tool bits were revolutionary when introduced to American industry 50 years ago. Today they are universally used on lathes, shapers, planers and boring mills.

Nine large blocks of SAE 1045 carbon steel, size 20 x 20 x 12" and weighing 1000 lb. are anchored with a rivet to the bed of a big 48" slide table and 150 hp Hypro planer. Two OK shankless flat-nose tools with high speed steel tool bits cut an 80° angle on four sides, making a flat pyramid. Chips are heavy 1/16" depth, 3/4" wide. Feed, 40 ft/m.



For the second operation, the blocks are swiveled around and a rugged intermittent cut is made. Carbide could not stand the shock of such a powerful impact. When dull, tool bits are switched, right to left, doubling to life of the bit and continuing production with the minimum of downtime.

OK tools are built for heavy machining. Holders are tough forgings. For tool bits, you have a choice of high speed steel, cobalt, Vasco Supreme and carbide.

Write for
OK Tool
Catalogs

TWO COMPONENTS—
BODY AND
BLADES



OK

modern milling cutters
for modern milling machines
THE OK TOOL CO., INC., Milford, New Hampshire

hard rubber fixed wheels. A foot-operated lock is furnished for holding the unit stationary when lowering or lifting loads. The unit is available in two models; namely, the WL-F58 with a height of 6 ft. 6 in. and a fork lift of 58 in., and the WL-F78 with a height of 8 ft. 2 in. and a fork lift of 78 in. Each model is available in various widths to handle pallets up to 36 in. long x 42 in. wide.



Lindberg "Sandstorm" Sand Blast Gun

Sand Blast Gun Is Self-Contained Unit

Designated as the "Sandstorm," a sand blast gun which is a self-contained unit and which can be operated on air pressures of 60 lb. or more has been announced by Lindberg Products Co., P.O. Box 885, Los Gatos, Calif. Designed for removing rust, scale, paint and dirt from hard-to-get-at places, the unit is said to be capable of handling all types of abrasives ef-

fectively, including silica sand, aluminum oxide and nut shell abrasives, metal shot, reflective materials and others. According to the manufacturer, the gun can also siphon liquids directly from drums or tanks (using a siphon tube) and can blast the liquids effectively for liquid cleaning. The body of the gun is a sturdy zinc die casting.



What

TO DO ABOUT Oversize and Bell-Mouthed Holes!

When tapping and reaming jobs come through with oversize and bell-mouthed holes, the trouble is not always the fault of the machine or the cutting tool. In fact, likely as not, it is caused by the work not being properly aligned with the spindle.

In the latter case, the remedy is simply to change over to a Ziegler Tool Holder which automatically compensates for inaccuracies in alignment up to 1/32" radius or 1/16" diameter.

On future tapping and reaming jobs try a Ziegler Holder and see how much better work your machines will perform.

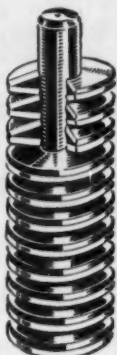


FLOATING HOLDER
for Taps and Reamers...

W. M. ZIEGLER TOOL CO.

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Because:

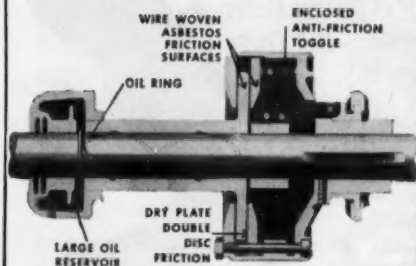
1. Unlimited life within borders of permissible loads.
2. No creeping, initial settling or gradual fatigue.
3. Axial center pressure.
4. Exact adjustment to the desired pressure.
5. Small constructional height, large deflection.
6. Large inherent damping.
7. Large impact damping especially with multiple stacking.
8. Excellent space disposition.
9. Spring pressure, Spring length and Spring deflection can be easily determined for the same Spring size or can be changed by lengthening or shortening of the Spring columns or by multiple stacking. In special cases the character line can be made to divert from its usual straight form by diversified stacking.
10. Most Spring sizes available from stock.

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Mastertools for Modernized Machining
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FAST ACTING-- POSITIVE CONTROL -- LONG LIFE



This time-tested clutch provides maximum power transmission at lowest cost. For specifications and prices on wide range of sizes, write for Bulletin No. 25M. Brown Engineering Co., 120 N. Third St., Reading, Pa.

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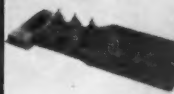
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PRESS ROOM EQUIPMENT

WIRE STRAIGHTENERS

Takes round or flat wire and tubing. Rolls adjustable by means of socket set screw. For use with automatic Slide, Roll or Hitch Feeds. Units available with 5, 7, 9 or 11 grooved rolls.



MOTOR DRIVEN

STOCK STRAIGHTENERS

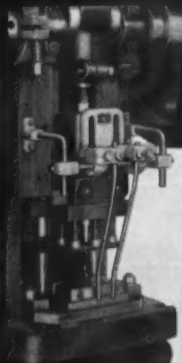
For all thin materials. Entering rolls power driven; top rolls are individually adjustable for stock thickness. Available in eight sizes.



SWEEP GUARDS

A positive safety guard on power presses. Easily installed. Downward motion of ram removes operator's hands. Rugged—withstands jarring impact of press. Needle bearings in guard housing assures long life.

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hard rubber fixed wheels. A foot-operated lock is furnished for holding the unit stationary when lowering or lifting loads. The unit is available in two models; namely, the WL-F58 with a height of 6 ft. 6 in. and a fork lift of 58 in., and the WL-F78 with a height of 8 ft. 2 in. and a fork lift of 78 in. Each model is available in various widths to handle pallets up to 36 in. long x 42 in. wide.



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Ziegler
HOLDERS
DRY

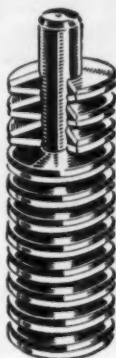
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for Taps and Reamers...

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Why SCHNORR Disc Springs?

Because:

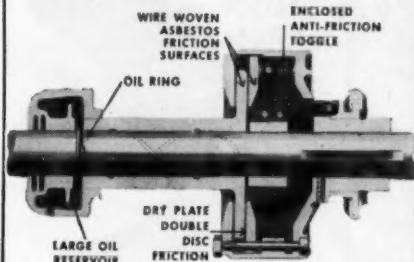
1. Unlimited life within borders of permissible loads.
2. No creeping, initial settling or gradual fatigue.
3. Axial center pressure.
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BROWN MULE PULL CLUTCHES

Buy



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Takes round or flat wire and tubing. Rolls adjustable by means of socket set screw. For use with automatic Slide, Roll or Hitch Feeds. Units available with 5, 7, 9 or 11 grooved rolls.



MOTOR DRIVEN STOCK STRAIGHTENERS

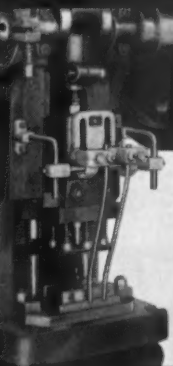
For all thin materials. Entering rolls power driven; top rolls are individually adjustable for stock thickness. Available in eight sizes.



SWEEP GUARDS

A positive safety guard on power presses. Easily installed. Downward motion of ram removes operator's hands. Rugged--withstands jarring impact of press. Needle bearings in guard housings assures long life.

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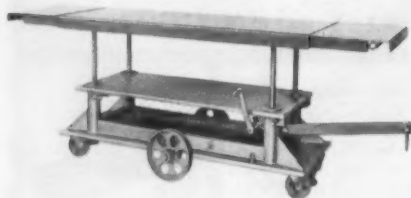


DURANT Tool Supply Co.

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Elevating Table Has Drop Leaves which Increase Length

The Hamilton Tool Co., 828 S. Ninth St., Hamilton, Ohio, has announced



Hamilton "Drop Leaf" Portelvator

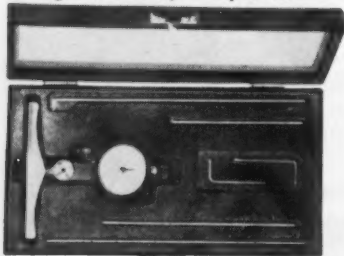
the "Drop Leaf" Portelvator, an elevating table with drop leaves which increase the table length to a 108-in. maximum. The leaves are supported by four pull bars which retract into a space provided under the top table surface. The top table surface, which has a 14-in. adjustment between 24 and 38 in. above the floor level, is 26

in. long x 72 in. wide. The capacity of the table is 5,000 lb., and this weight can be easily moved from "low" to "high" position through a power transmission, which utilizes an arrangement of worm, worm gear and screw, actuated by a hand crank located on the side of the table. Four point support of the load is said to eliminate the possibility of tipping on ramps or uneven floors.

The table is mounted on two 12½-in. wheels and four 6-in. casters to provide a short turning radius and easy positioning. A 30-in. retractable tongue affords a hitch for towing. Floor locks are provided at each end of the table for rigid positioning. An extra fast lift mechanism for light loads or quick return and a vertical post for storage of the crank when not in use are provided. All bearings are equipped with pressure grease fittings.

Reliant depth and groove location G A G E

- Fully adjustable from 0" to 6¼" without changing rods.
- Light and easy to operate.



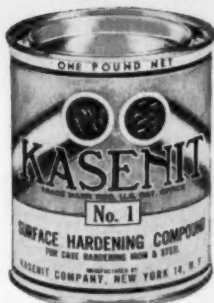
- Positive and accurate inspection of depths of holes, slots, shoulders and recesses.

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SOUTH GATE, CALIFORNIA

CASE HARDENING



**Non-Poisonous
Non-Explosive
Non-Inflammable**

5-lb. can \$9.25 plus postage

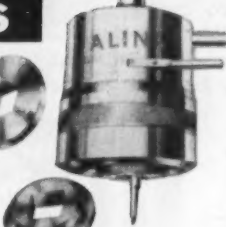
For brochure and name of your nearest distributor write to:

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799 GREENWICH ST., NEW YORK 14, N. Y.**

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MACHINERY
EQUIPMENT**

BORE HOLES



Also other polynomial profiles—male or female—with taper if required. Less than .020" corner radius; $\pm .0005$ " accuracy. For special shapes templates of $\frac{1}{4}$ " nylon can be machined in 15 minutes and re-useable whenever needed. Costly hours reduced to mere minutes with Alina Profile-Boring Head.

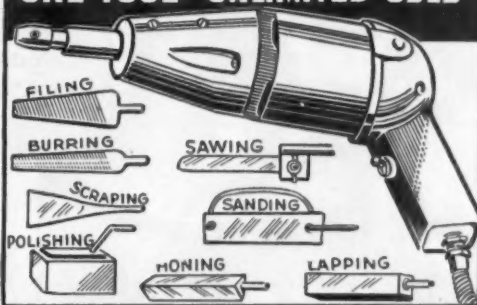
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MCHY. CO. CHICAGO 44, ILL.

STOP... HAND WORK

Use these Handy PORTABLE ELECTRIC RECIPROCATING TOOLS for Greater Production, Better, More Uniform Work — All with less Operator Fatigue. Fixed strokes are $\frac{1}{8}$ " or $\frac{3}{8}$ " long. Operate on 110 volts AC-DC. Deliver 1000 PUSH-PULL strokes per minute.

ONE TOOL - UNLIMITED USES



Try one of these tools on your next job.

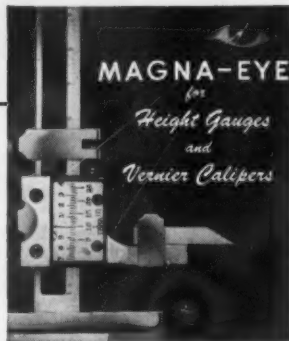
ACME TOOL COMPANY

73 WEST BROADWAY

NEW YORK 7, N. Y.

Tool Cabinet Utilizes Six Tool Holding Panels

Designated as the Model 400 "Tuldex," a tool cabinet which features two doors and six 12 x 18-in. tool holding panels made of tempered, perforated hardboard has been announced by Huot Mfg. Co., 538 N. Wheeler St.,



MAGNIFIES the "hard to read" vernier scales on calipers and height gages. No more eye strain, guess work or hit or miss setting and reading. LENS is finest quality optical glass, specially designed and ground for the purpose with utmost optical skill. 4X magnification shows lines true and correct. In daily use in plants of Westinghouse, General Electric, General Motors, Chrysler, Packard, Ford, Boeing Aircraft, Bendix Aviation and many others engaged in defense work. Made in 3 sizes to fit Starrett, Brown & Sharpe, Lufkin Tools, and others of similar design. 5 No. 100 for 6" Vernier Calipers; 5 No. 200 for 10"-12" Height Gages, also 10"-18"-24" Vernier Calipers; 5 No. 300 for most popular type 18" and 24" Height Gages and for 36", 48" and 60" Calipers.

For Complete Information Write, Phone or Wire

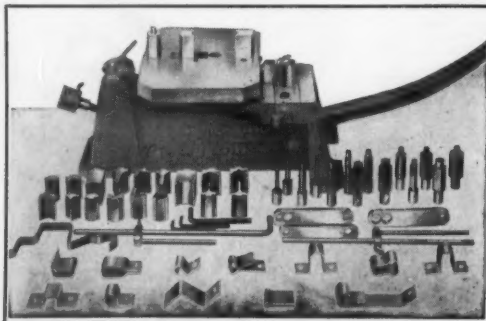
STEBAR COMPANY
711 W. Lake St. Minneapolis 8, Minn.



Huot Model 400 "Tuldex" Tool Cabinet

St. Paul 4, Minn. The unit, it is claimed, provides more than 24 sq. ft. of tool storage area. The cabinet is made of heavy reinforced steel, finished in attractive blue and gray hammerloid baked enamel. A drawer is included for the storage of power tools. The tool panels of the unit move on individual tracks on geared, self-lubricating nylon bearings. Doors swing on the same type of gears and bushings, moving completely out of the way when open. Built-in top and bottom locks are included.

The unit may be placed on a bench, hung on the wall or mounted atop a portable table. The overall size of the cabinet is 29 x 26 x 13 $\frac{3}{4}$ inches.



Multiform BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

**AIR OR HAND MODELS FOR UP TO
1/4" to 4" MATERIAL**

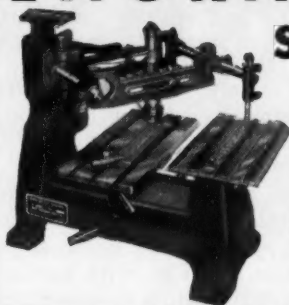
Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.

Dept. 6-M

Kalamazoo, Mich.

ENGRAVE STEEL



AND
OTHER
METALS
OR
MATERIALS
including
PLASTICS

with the PREIS-PANTO Model UE-3 HEAVY
DUTY BENCH TYPE ENGRAVING MACHINE.

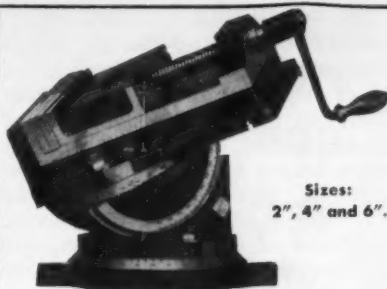
This is the machine the stamp and die engravers use. It is an exceptionally well built and highly precise machine — easy to use and widely adaptable. Write for FREE Catalog.

* TRADE MARK Reg. U.S. Pat. Off.

H. P. PREIS ENGRAVING MACHINE CO.

657 U.S. ROUTE 22

HILLSIDE, N. J.



Sizes:
2", 4" and 6".

**MAKE SET-UPS
FASTER--**

Conserve valuable production time by using the fully universal, easily-operated MASTER MULTI-SWIVEL VISE for intricate, angular set-ups in your shop. Three swivels instantly set any compound angle. Used in shops throughout the world. Interchangeable platen optional.

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DONOVAN MFG. CO.
80 BATTERY MARCH ST., BOSTON 10, MASS.

NOW

A WIDE RANGE

OF

Air

Presses



These presses deliver from 4 to 28 times the air line pressure, cost from \$27.50 to \$135.00, and will pay for themselves many times over in fast-

MEAD SPECIALTIES COMPANY,

er, more uniform production on light staking, crimping, assembling jobs. Write for new catalog of air cylinders and other air-operated devices.

4114 N. Knox Ave., Dept. AA-64, Chicago 41, Ill.

Instrument Can Be Used As Vernier Caliper and Height Gage

Designated as the "Microlock," a Mauser combination vernier caliper and height gage for toolmakers and mechanics has been announced by George Scherr Co., Inc., 200-MM Lafayette St., New York 12, N. Y. The instrument combines the time-saving advantages of quick adjustment and rigid tightness of the slide with a micrometric fine adjustment mechanism. The fine adjustment mechanism is said to make the caliper ideal for use as a height gage by adding a sturdy base

and a scribing attachment with an adjustable scriber. The scriber can be lowered right to the surface plate so that marking and reading can start from the bottom with the vernier scale set to zero. Using the caliper separately enables the taking of outside, inside and depth dimensions, as well as root measurements of threads, gears, grooves, and so on.

The upper scale of the vernier is graduated into fractions of an inch with 1/128 vernier; the lower scale is divided into 0.025 in. with vernier reading of 1/1000 inch. A vernier 1.225

in. long, divided into 25 lines, extends over 49 graduations of 0.025 in. each on the main scale,

Now's the time to discard costly, obsolete methods . . . replace with *FEDERALS* for



**more
profitable
presswork!**

FEDERAL DIAL FEED PRESSES

Write for new Catalog

THE FEDERAL PRESS COMPANY
504 Division St., Elkhart, Ind.

Modernize with new Federal Dial Feeds and watch your production go up, and costs down! Rugged, precision-built, versatile, this press does three to five times the work of a standard press; cuts downtime, reduces accidents, eliminates expensive equipment. Finest materials and workmanship. Sizes, 6 to 80 tons. Automatic feed and ejectors, if desired.



Mauser Combination Vernier Caliper and Height Gage

making the difference between division of vernier and main scale large enough to read 1/1000 in. with the naked eye. An open slide permits view of the entire scale, resulting in fast reading and minimum errors.

Lift Truck Has Unusually Light Counterweight

Designated as the "Counterweight-er," an unusually light, battery operated, hand propelled, 1000-lb. hydraulic fork lift truck which has a light counterweight and which is designed for handling double-faced pallets, wire coils, tote pans, rolls, dies, jigs, carboys and practically every type of solid has been developed by Big Joe Mfg. Co., 900 W. Jackson Blvd., Chicago 7, Ill. The front straddles have



Big Joe "Counterweight-er" Hydraulic Lift Truck

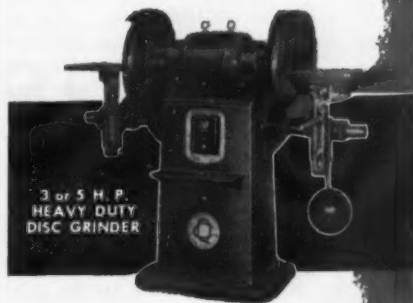
been eliminated, thus providing an unobstructed approach to any load. The truck, it is claimed, can be used in limited floor capacity areas and can be transported in elevators of a limited capacity. Having a low overall height, the unit can operate under low height limitations.

The truck is equipped with adjustable forks to increase its versatility, and for lifting cylindrical items, a ram attachment can be quickly and easily interchanged with the forks. A special roll handling attachment is also available.

June, 1954

"Time Savers in any shop"

QUEEN CITY heavy duty DISC GRINDERS and BUFFERS



Queen City Heavy Duty Disc Grinders and Buffers are designed for the hardest use. Extra heavy spindle, large, high quality ball bearings and special duty motors all contribute to long, trouble-free service.

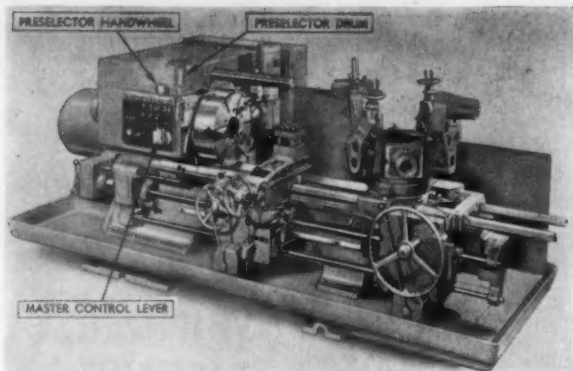
The complete range of Queen City Grinders and Buffers . . . floor and bench types . . . in sizes from $\frac{1}{8}$ to 10 H. P. . . is described in a free 24-page catalog.

Write for detailed literature

**QUEEN CITY
MACHINE TOOL CO.**

QUEEN CITY
MACHINE TOOL CO.
3911 Kellogg Avenue,
Cincinnati 26, Ohio

"Queen City Grinders—Famous For Over 50 Years"



**Warner & Swasey 3A M-3500
Heavy-Duty Turret Lathe**

Turret Lathe Features Speeds with Small Increments

The Warner & Swasey 3A M-3500 Heavy-Duty Turret Lathe, shown here-with, has been announced by The Warner & Swasey Co., Cleveland, Ohio. The machine features adequate power to enable users to take full advantage of future improvements in tooling, cutter design and cutter materials; large number of speeds with small increments, enabling an unusually wide range of work diameters to be machined at ideal cutting speeds; and automatic hydraulic gear shifting which reduces handling time and operator fatigue.

The 3A M-3500 machine is available with either a 4½ or 6 in. round bar capacity. The effective swing is 23½ inches. The 4½-in. capacity spin-

dle has an 11-in. American Standard flanged nose, and the 6-in. capacity spindle has a 15-in. American Standard flanged nose.

The design includes a headstock, which is a 16-speed hydraulic shift preselector head. The headstock has disc-type hydraulic clutches for forward, reverse and brake action, with reverse speeds exactly equal to forward speeds. Shifting of gears is done hydraulically and automatically by four hydraulic cylinders in the headstock.

In addition to a preselector control knob and drum dial, the control panel contains high-low motor start buttons, a motor stop button, a chuck wrench "external-internal" selector switch, a headstock oil pressure gage and a spindle inching button which provides micro-movement of the spindle for chuck and fixture positioning. The head end gearbox incorporates anti-friction bearings with automatic oil supply. The pan is designed to accommodate the large sump required for the hydraulic system and the large headstock.

ULTRA-CHEX GAGE BLOCKS

for Every Need!

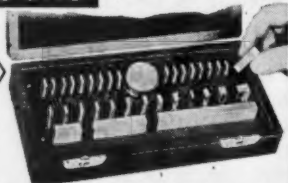
Supplied in one Superior Accuracy
5 MILLIONTHS ± ACCURACY

34 BLOCK SET (shown) **\$125** INCL. OPT. PARALLEL

82 BLOCK SET **\$275** IN CASE

These sets will supply the needs of any discriminating shop that must work to gage-block precision.

IMMEDIATE DELIVERY



9 Block Set

For Individual Mechanic

\$22.50

OPTICAL PARALLEL \$5.00 Extra

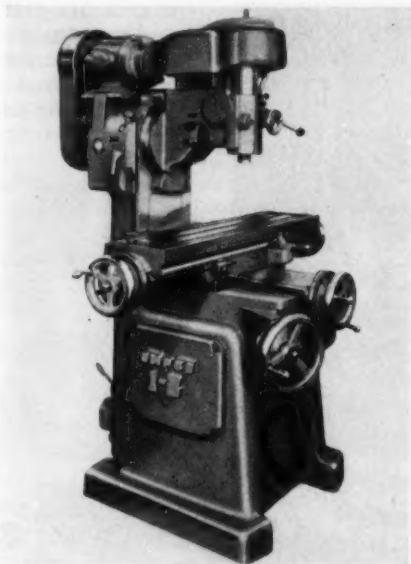
WRITE FOR ILLUSTRATED FOLDER

GEO. SCHERR CO., INC.

200-MM LAFAYETTE STREET • NEW YORK 12, N. Y.

Ram-Type Vertical Mill for Production and Toolroom Milling

Designated as the Model 1-B, a ram-type vertical mill which is designed for both production and toolroom milling operations has been announced by Industrial Metal Products Corp., 3412 W. St. Joseph St., Lansing, Mich. A unique feature of the machine is that the head is vertically adjusted by a counter-balanced ram which is said to provide accuracy and rigidity because



IMPCo Model 1-B Ram-Type Vertical Mill

of a maximum scraped bearing surface area. The table and easy-to-reach centralized controls always remain the same height from the floor. The table working surface is 10 x 40 in., maximum longitudinal table movement is 24 in. and cross movement is 12 inches.

The range of the opening from the table to the spindle nose is $4\frac{1}{8}$ in. minimum to $18\frac{1}{4}$ in. maximum, and the spindle quill diameter is $3\frac{1}{2}$

Producers Pare Stamping Costs

Modern Coil Handling Equipment Widens Use of Low Cost Coil Stock

The battle to keep down costs is going well for producers of stampings. Coil stock and modern coil handling equipment are the decisive factors. Coil stock, with only two scrap ends to its entire length is far more economical than strips of straight stock with two scrap ends to every ten feet. Moreover, the type of coil loading and handling equipment built by F. J. Littell Machine Co. makes coil stock easier to handle than straight stock. Stamping producers are taking full advantage of these developments. Coil stock and Littell Coil Hooks, Reels, Straightening Machines and Automatic Roll Feeds are in wider use today than ever before.

Hooks Serve Two Ways...

Littell Hooks make it a simple matter to unload coils on delivery, and to load reels. The variety of sizes have lifting capacities from 1,000 to 40,000 pounds.



Two Types of Reels...

Littell Coil Cradle Reels mount heavy coils, up to 30,000 pounds. Spindle Reels handle coils up to 40,000 pounds. Each type is available in plain or motor driven designs.



Straighteners Flatten Stock

... Removing curvature from coil stock as it passes from reel to punch press die is the function of Littell Straightening Machines. All models are the same basic design. Variation is in the number and diameter of straightening rollers employed... from 1" to 90" in width, and from .010" to .125" thickness.



Automatic Roll Feeds... Press output in many shops has been multiplied five times by simply attaching Littell Roll Feeds to presses for blanking, drawing, piercing, or cut-off work. The Littell Roll Feed is used with compound dies, single station dies, and progressive dies. Standard models are easily attached, serve all types of presses, and handle all standard widths and thicknesses of stock.

Descriptive details and prices on Littell Hooks, Reels, Straighteners and Roll Feeds are available on request. Inquiries are given immediate attention when addressed to

F. J. Littell Machine Co.

4163 N. RAVENSWOOD AVE., CHICAGO 13, ILL.

in. with a 5 in. travel. The speed range of the machine is from 75 to 3,000 revolutions per minute.

Other design features include heat-treated alloy steel gears, precision spindle bearings, extra large graduated dials for easy reading and a one-shot lubrication system. Optional equipment available includes a large 10 x 48-in. table, longitudinal power feed for the table, verniers and a coolant system.

Powdered Steel Alloy Is Self Oiling

A powdered steel alloy guide pin bushing which is heat treated and which has sealed internal oil wells as an integral part of the bushing has been announced by Richard Brothers Punch Division, Allied Products Corp., Dept. 77, 12625 Burt Rd., Detroit 23, Michigan.

The bushing is shipped to the user with the oil wells completely filled, and no external oiling is said to be required throughout the life of the bushing. According to

Ball Seat
lapped
to seal
under 1700 psi
with...



HYP-REZ

The .003" wide concave ball seat of the Premax Engine Pressure Indicator seals gas-tight under pressures of 125 to 1700 psi. This gauge is a nationally-known product of Bacharach Industrial Instrument Co., Pittsburgh.

High Precision
DIAMOND
COMPOUNDS

For critical jobs — for dies, molds, tools, gages — Hyprez provides assured results. Exactly graded diamond powders; permanent dispersion in scientifically formulated vehicles; continuous controls and research are your guarantees of finer finishes faster with Hyprez.

Ask for a free demonstration or technical bulletin No. S-654

HYPREZ DIVISION
ENGIS EQUIPMENT COMPANY, CHICAGO 5, ILL.
431 SOUTH DEARBORN ST.



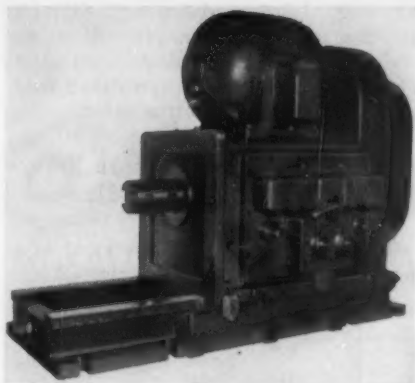
Cutaway view of R-B Powdered Steel Alloy Bushing showing internal oil wells

the manufacturer, the structure of the powdered metal assures proper lubrication to the friction surfaces. Guide pin wear is said to be minimized, as well as the possibility of seizing and galling of guide pins.

Hydraulic Feed Unit Is Completely Self-Contained

Hoefer Mfg. Co., Inc., Dept. Q, Freeport, Ill., has announced a completely self-contained hydraulic feed unit which is said to be applicable to a variety of workpieces or operations requiring drilling, reaming, boring, facing or milling. According to the manufacturer, the unit provides single purpose machining efficiency, yet maintains wide production flexibility. The unit may be mounted on any machine bed or column at any angle, and removable heads can be interchanged as desired. The unit features automatic cycling and an easily removable power pack panel which slides entirely out of the unit and permits fast simple inspection and adjustment.

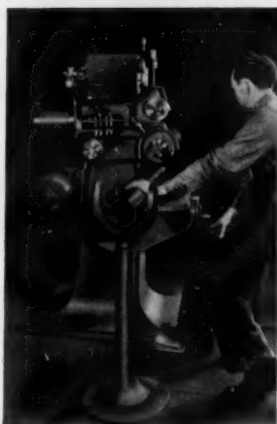
The unit is available with panel and controls mounted on either the right or left side. The panels, however, are not interchangeable. The hydraulic feed is valve controlled and infinitely



Hoefer Hydraulic Feed Unit

variable within the feed range of the unit, starting from $\frac{1}{2}$ in. per minute. Dwell may be used in the automatic cycle by installing a timer relay to control the return stroke. The spindle drive is through pick-off gears from the main drive motor. Bearings and

STEEN PIPE AND TUBE CUT-OFF MACHINES



For faster cutting

If you cut pipes and tubes . . . in small or large quantities . . . you can cut faster—easier—with a Steen Cut-Off Machine. Available in hand and automatic air-operated models for pipes and tubes up to 12" diam. Also, *Manufacturers of Cut-Off Wheels . . . Chaser and Wheel Grinders. Request Circulars Today.*

Continental MACHINE CO.

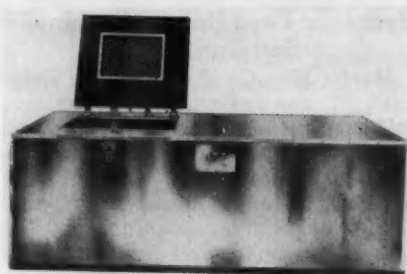
SINCE 1919

1952 N. MAUD AVE. • CHICAGO 14, ILL.

ways are lubricated through fittings, and the transmission, pick-off gears and chain drive are splash lubricated. The ways are scraped and fitted with taper gibs for wear adjustment.

Test Unit Has Temperature Range from Minus 100 to Plus 200 Deg. F.

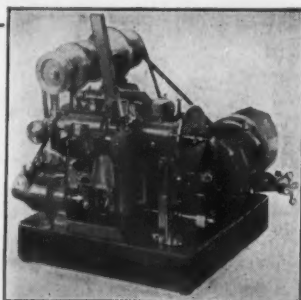
Primarily for testing electrical components, Webber Mfg. Co., Inc., Dept.



Webber Model W-9-100 FH Test Unit

R-294, 2740 Madison Ave., Indianapolis 3, Ind., has announced the Model W-9-100 FH Test Unit which has a temperature range of from minus 100 to plus 200 deg. F. A special type door incorporates a removable "plug" panel containing 40, $\frac{1}{4}$ -in. diameter openings for test lead connection to the inner chamber. The plug may be easily replaced with similar panels to fit any requirement. Electrical terminals may be installed and located as desired. The heat cycle of the unit is applied through Colrod-type heating elements. Adequate safety factors prevent surface temperature from exceeding 400-deg. Fahrenheit.

The unit is constructed of stainless steel throughout with $5\frac{1}{2}$ in. of superfine fiber glass insulation. The test chamber is constructed of copper. Inside dimensions of the test chamber are 10 in. wide x 32 in. long x 26 in. deep.



WALTHAM

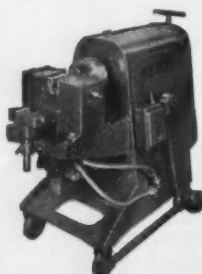
Pinion and Gear Cutting Machines

with revolving cutter will make 1, 2 or 3 successive cuts for watch pinions or may be used for fine pitch gears up to $1\frac{1}{2}$ " dia. Blanks are held and indexed by work spindle and usually supported by a tail center. Only straight teeth can be cut.

WALTHAM MACHINE WORKS

BOX 48 • WALTHAM, MASS.

Pinion and Gear Cutting Machine, Thread Milling Machine, Cylindrical Sub-Presses, Cutter Sharpening Machine, Small thread milling and gear cutters, Small special machinery.



**for chamfering bar stock
PRIOR TO SCREW MACHINE OPERATIONS**

The KENT BAR POINTER

Entirely self-contained. Manual or pneumatic operated feed and gripping mechanism. Capacity $\frac{3}{8}$ " minimum diameter up to $2\frac{1}{4}$ " hexagon. Stationary and portable.

Literature available.

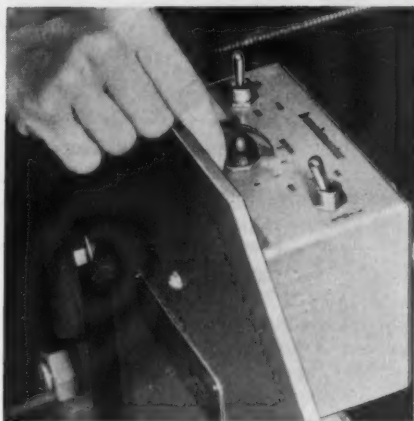
The KENT MACHINE CO., Cuyahoga Falls, O.

Drillers • Threaders • Slotters • Countersinkers • Bar Pointers

Electronic Timer Provides Delayed Shut Off or Delayed Start

Benchmark Mfg. Co., 1835 W. Rosecrans Ave., Gardena, Calif., has announced that the Tele-Trol Electronic Timer, originally developed as a time delay shut off for its Koil Kradles, is now available for application to a wide variety of mechanical and electrical equipment. The timer is said to be continuously variable from 0 to 10 seconds and immediately recycles when triggered. Since the unit is of the accumulative type, the recycle time is added to the balance of the previous cycle, if triggering occurs before shut off is reached.

The timer handles a 30-amp. non-inductive load at 125 volts, a.c. and operates on 110-volt single phase current. Other models are available for 220 or 440-volt three-phase operation. The overall size of the unit is approximately 3 x 4 x 5 inches. The Tele-Trol



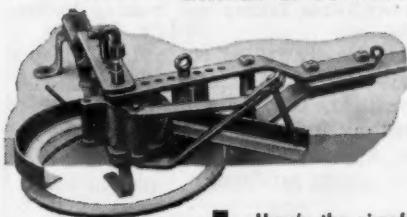
Benchmark Tele-Trol Electronic Timer

Timer, it is claimed, furnishes an accurate means of delaying shut off or start on all types of units, such as work feeding devices and other equipment utilizing electrical motor drives.

**one man
one bender**

**with HYDRAULIC
ATTACHMENT**

**BEND Angle Iron
INWARD or OUTWARD**



**Bends Flat,
Round, Bar,
Angle
and Pipe**

HOSSFELD

**UNIVERSAL
IRON BENDER**



**MAKE SMOOTH
BENDS ON THIN
WALL CONDUIT**

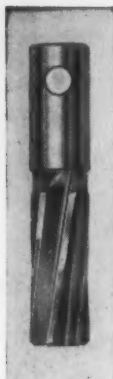
Here's the simple solution to two of your most difficult bending problems . . . angle iron and conduit. These special attachments for your HOSSFELD Iron Bender bend these special materials neatly, quickly, accurately to your exact specifications . . . a smooth, easy, one-man operation. Ask about the HOSSFELD Hydraulic Attachment that gives you complete mechanical operation.

GET ALL THE FACTS! WRITE TODAY!

HOSSFELD MFG. CO.

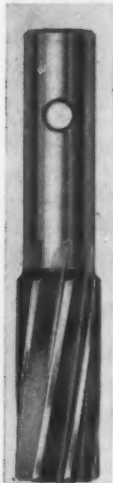
402 W. 3RD STREET

WINONA, MINNESOTA



**STANDARD DIMENSION
STUB SCREW MACHINE
REAMERS**

Finished blanks in stock: Sizes No. 00 to No. 23 to grind from .0600" to 1.0100". Tolerances unless otherwise specified plus or minus .0001".



**BUOL SPECIFICATION
STUB SCREW MACHINE
REAMERS**

For larger type Gridleys, Chucking Machines, Turret Lathes, and Hand Screw Machines. Also used extensively for second operation work.

Finished blanks in stock to grind from .0930" to 1.2500". Tolerances unless otherwise specified plus or minus .0001".



**SPECIALS
MADE TO ORDER
PROMPTLY**

Backed by 27 years of manufacturing experience on reamers exclusively, we also make Die Clearance Reamers, Helical Taper Pin Reamers, Carbide Tip Reamers, and Special Reamers to your blue print specifications and requirements.

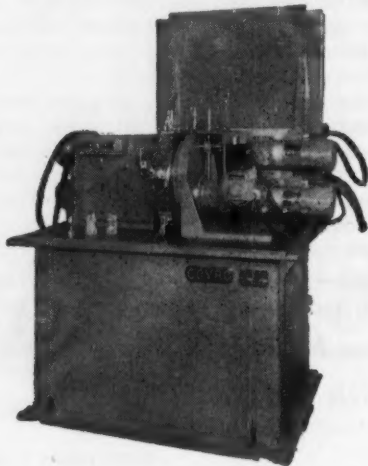
Write for bulletin giving full details.

MANUFACTURERS' AGENTS: A few exclusive territories still open. Write us.

THE BUOL MACHINE CO.
MEADOW & PARK STREETS
NEW BRITAIN, CONNECTICUT

**Machine Drills and Reams
Opposed Holes in Line**

A machine which is designed to drill and ream opposed holes in line at an unusually high production rate has been announced by Govro-Nelson Co., 1933 Antoinette, Detroit 8, Mich. The machine incorporates a six-station Geneva-type indexing dial, electrically interlocked with four Govro-Nelson KH automatic drilling units. The part to be reamed and drilled, upon being manually loaded and clamped, is au-



Govro-Nelson Drilling and Reaming Machine

tomatically drilled, reamed, unclamped and ejected. According to the manufacturer, the machine is capable of drilling and reaming two opposed holes in a part at the production rate of 900 pieces per hour.

Optical Bench Comparator Features Understage Illumination

An optical bench comparator with understage illumination for fast, convenient handling of the parts being inspected has been announced by Bausch & Lomb Optical Co., 50529 Bausch St., Rochester 2, N. Y. The



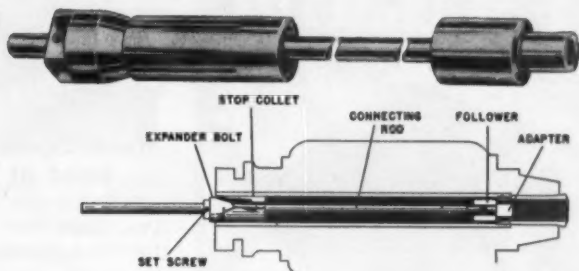
Bausch & Lomb Optical Bench Comparator
in use

instrument is designed for fast comparison of precision parts against master charts on either large-volume quality control operations or short-run inspections. Because the lighting unit

is located below the stage, the stage itself is completely accessible, directly in front of the operator. When large volume production is involved, the operator merely places the work on the stage, using simple locating stops. The part under inspection is shown in a clear, bright silhouette on a 10-in. diameter wide-angle screen which permits viewing by several people at the same time. Selections from five different projection lenses provides magnification of 10X, 20X, 25X, 31¼X and 50X. Lenses are interchangeable.

Through the addition of a measuring stage accessory with micrometer drums graduated to 0.0001 in., the projector may also be used as a measuring instrument. The comparator is 21 in. long x 15 in. wide x 23 in. high and weighs 110 lb. The base is cast aluminum and the housing is sheet steel. The regular stage, or work table, measures 6 x 10 inches. The measuring stage has a 1 to 2-in. movement.

SAVE YOUR LATHE CUT-OFF TIME



Stack the 12 ft. bars in hack saw—cut 50 to 200 pieces at a time by just releasing saw vise—pulling stock forward and closing vise; 2 to 3 minutes man time while cutting same quantity in lathe would consume 3 or more hours.

With KNAPP COLLET STOP in lathe, place work piece in collet. This way, the overall length of EVERY piece MUST be identical, consequently every lateral cut MUST BE IDENTICAL on BOTH ends.

SALESMEN WANTED

KNAPP INDUSTRIES • 107 N. Franklin St., Syracuse 2, N. Y.

Barrel Pump Handles Wide Variety of Liquids

Engineered Equipment Co., Box 207M, Warsaw, Ind., has placed on the market a barrel pump, identified as the Model 101, which is designed to expedite the filling and emptying of containers. A self-priming continuous-flowing unit, the pump is said to be capable of handling a wide range of fluids, including viscous or oily liquids such as motor oil, linseed oil, fuel oil,



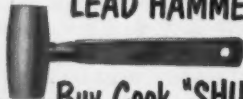
Engineered Equipment Model 101 Barrel Pump

coolants, syrups and thinners. According to the manufacturer, the pump can empty a 55-gal. drum in from 8 to 10 minutes. The handle is turned in one direction to fill the barrel and in the opposite direction to drain it. The spout is threaded for $\frac{3}{4}$ -in. i.d. hose connection, and a combination $1\frac{1}{2}$ and 2-in. bung nut is furnished.

Hand Operated Press Brake Is Rated at 8-Ton Capacity

O'Neil-Irwin Mfg. Co., 576 Eighth Ave., Lake City, Minn., has announced the Di-Acro 24-Inch Hand Operated

LEAD HAMMERS—



Buy Cook "SHUR-GRIP"



They're a MUST in every shop where many blows have to be struck without marring surfaces. Available with "SHUR-GRIP" drop forged handles.

Write for circular and prices

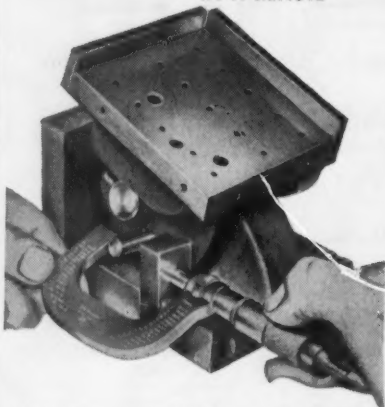
LAWRENCE H. COOK, INC.

67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

PRECISION
MADE

BEMISINE

ANGLES TO A MINUTE ...
IN A MINUTE



DRILLING — MILLING — JIG BORING
GRINDING — INSPECTION

Write for Bulletin

Mutual Machine Co., Hudson, Mass.

AT LAST!

A Low-Priced Dial Type Indicator

Has 2 contacts $1/32$ " threaded within $1/8$ ". Double Faced. Reads front and back. Two Crystals. Double faced dial indicator complete with plated holder including $1/32$ " and $1/8$ " contacts —

Black Penrate\$6.95

Satin Chrome 7.95

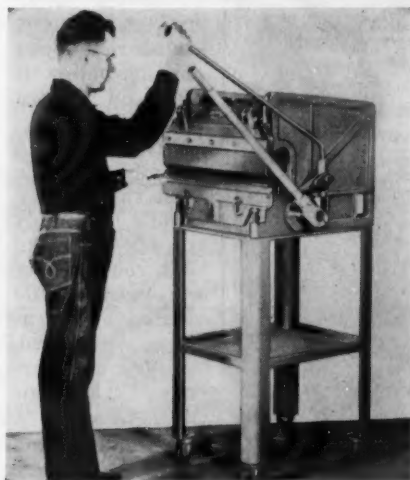
No. 5 Superior Universal Indicator Holder\$3.95

SUPERIOR INDICATOR CO.
P.O. Box 734, Rochester 3, N. Y.



Press Brake which is rated at 8-ton capacity.

The machine is said to incorporate a special cam lever mechanism which provides ample power for forming, blanking, piercing, drawing and trimming operations, plus a ratchet drive system that multiplies the power for heavy forming jobs. According to the manufacturer, the brake will form 16-gauge mild sheet steel across the full 24-in. forming width and 10-gauge mild sheet steel



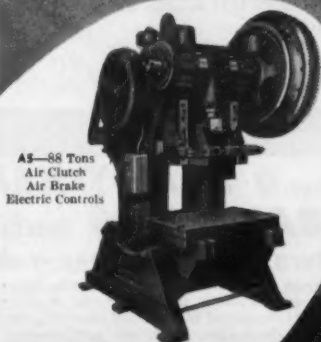
Di-Acro 24-Inch Hand Operated Press Brake in use

across a 12-in. forming width, as well as Inconel, brass, aluminum, stainless steel, chrome molybdenum and all other ductile materials.

The machine has a width of stroke of 24 in., a stroke of the ram of 2 in., a 6-in. depth of throat and a width between housings of 14 in. The ram guides are of hardened steel, precision ground for long operation. The bed adjustment of the brake is 1½ in. The press brake is available with a complete line of standard as well as special dies.

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a half century of
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for today's exacting demands.**



AS-88 Tons
Air Clutch
Air Brake
Electric Controls

- Engages smoothly; no sledge hammer blow.
- Inch, single stroke, or continuous.
- Less heat as brake is released when clutch is engaged.
- Less current used; brake is off when clutch is engaged.
- Clutch torque output in direct ratio to applied air pressure and controlled by regulator valve.
- Two run buttons, one stop button, one inch button operate on 110 volt regardless of motor current (220 or 440).
- No back lash when using air cushion or heavy spring pressure pads.
- Clutch is reversible (By reversing wires on motor you can inch out of stall).

Robinson Presses are available (in either pin type or air clutch models) in sizes from 32 to 88 Ton.

Write for illustrated
brochure and
specification sheet.

ROBINSON
PRESSES

NEW ALBANY MACHINE MFG. CO.
NEW ALBANY, INDIANA

Machine Performs Multiple Turning or Grinding Operations in One Setup

Designed to perform multiple turning or grinding operations in one setup, the Frauenthal Series 3100 Turning and Grinding Machine which has been developed primarily for the jet engine industry but which is applicable to any work where unusual tolerances are required on concentricity and parallelism of turned and ground sur-

faces has been announced by Frauenthal Division, Kaydon Engineering Corp., Muskegon, Mich. The machine is available in four table sizes; namely, 36, 42, 48, and 52 in., all of which have a 60 in. swing. Power driving for the work table is provided by a 10-h.p. d.c. drive unit, with power transmitted to the table spindle through a "timing" belt. According to the manufacturer, the work spindle pulley is ball bearing mounted in a heavy hous-

ing which is bolted to the lower area of the base, and all radial load on the pulley is taken on its own bearings and is not transmitted in any way to the table spindle. The spindle assembly is a self-contained unit, consisting of a rugged spindle carried by extra-large, preloaded, anti-friction bearings in the spindle housing.

The right-hand compound mounts a rugged hydraulically actuated turret slide equipped with a cam-locking, manually rotated five-station tool turret. The turret slide can be rotated 45 degrees either side of vertical. The left-hand compound is equipped with a direct connected self-contained grinding

"our 4 'BEAR' DY-NAMIC BALANCING machines turn out 1000 pieces a day... each balanced to our tolerance in less than two minutes!" says Thompson Morrison, Vice-President of Morrison Products, Inc., Cleveland, Ohio. Shown are two of the four "Bear" Dy-Namic Balancing Machines which have been in operation here since 1945.



"We found that Dy-Namic Balancing of cooling fans reduces vibration, lessens bearing wear and noise, and results in greater customer acceptance of our products."

"When blower wheels are balanced STATICALLY only, DY-NAMIC unbalance is often increased... that's why we use the 'Bear' method, which takes care of both static and dy-namic balance in one operation."

Like hundreds of other industrial plants, Morrison Products Company has discovered that "Bear" Dy-Namic Balancing Machines attain high standards of accuracy at favorable production rates and

with minimum capital investment. Reduce noise, vibration, friction, bearing failure thru Dy-Namic Balancing. **FREE MANUAL** shows how! Write: Bear Mfg. Co., Dept. M25, Rock Island, Ill.



"BEAR"

STATIC AND DY-NAMIC BALANCING MACHINES

balance rotating parts weighing from 4 oz. to 8 tons



Frauenthal Series 3100 Turning and Grinding Machine

spindle and is capable of an 8-in. hydraulically actuated vertical stroke, plus a 4-in. manual adjustment. Maximum angle setting of the compound is 45 degrees either side of vertical. The grinding spindle itself can be swivelled through 180 degrees.

Direct current is said to provide infinitely variable, electronic potentiometer-controlled table speeds up to 175 r.p.m. Dynamic braking of the table and jog button control are standard equipment.

Shim Stock Is Made of Laminated Aluminum

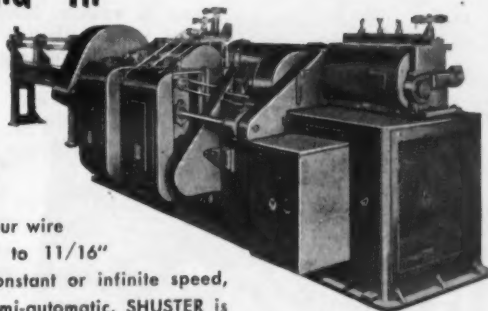
Laminated Shim Co., 3304 Union St., Glenbrook, Conn., has announced the availability of shim stock made of laminated aluminum in which the laminations are bonded over the entire surface. The stock is said to peel for adjustment in exactly the same way as the company's brass and steel shims. The material makes available all the advantages of aluminum; namely, light weight, freedom from corrosion and freedom from electrolytic action. The laminated aluminum shims are available either custom stamped to user specifications or as

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Automatic

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& CUT OFF MACHINES**



There is a SHUSTER for any of your wire straightening needs from .025" to 11/16" diameter. Whatever the model, constant or infinite speed, dual or single control, fully or semi-automatic, SHUSTER is the "name brand" that the machines themselves keep selling.

4AV
Cap. 3/8"-11/16" Diameter

METTLER MACHINE TOOL, INC.

Representatives in all principal cities and foreign countries.

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New Haven, Conn.

laminated sheet stock in thicknesses from 0.015 to 0.125 in. and in sizes to 20 x 48 inches.

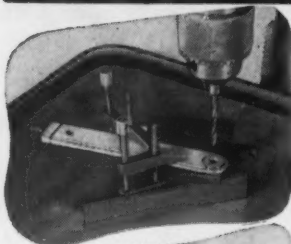
Toolholder Converts Finger Tools into Combination Hand Tool

The Micro Tool Co., 10 Sigourney St., Hartford 5, Conn., has announced the Brooks Toolholder which is said to convert four separate small finger tools into a combination hand tool de-

signed to afford a full hand leverage in the seating of or the loosening of socket head screws and nuts, as well as multiple-spline head screws and Phillips head screws. According to the manufacturer, reach and hand leverage is obtained by reversing the wrench. The toolholder is made of Zamac alloy, weighs 4 oz., and is 4½ in. long with a ribbed handle that fits snugly in the hand.

The holder is being made in three sizes; namely the No. 1 with from 0.050 to 3/32-in. wrenches for 17 screw sizes, the No. 2 with four

Drill Holes within .001" Accuracy with the Master Optical CENTER LOCATOR



Speediest—Simplest—most accurate method of locating centers and drilling holes. For a decade, machinists have been drilling and spacing holes with the Center-Locator to within .001". Just the thing for drilling round holes in thin material . . . avoiding drill run-outs . . . counter-boring holes with an ordinary drill. Makes your drill press do the work of a jig boring machine!



Easy to operate: Simply lay out your work with a height gauge, locate center through the powerful magnifier, then replace the magnifier with any of 16 drill bushings furnished.



38⁵⁰

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Unconditionally guaranteed.

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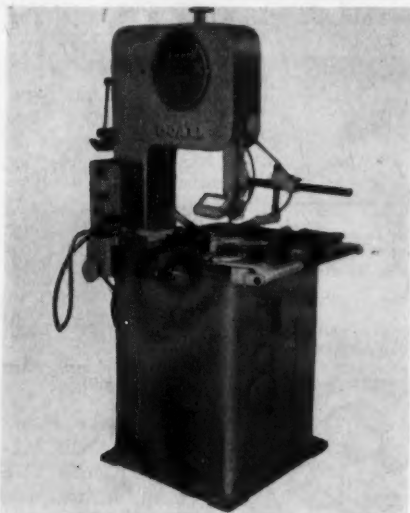


Brooks Toolholder in use

progressive sizes of wrenches from 1/8 to 7/32-in. for serving 18 sizes of socket head screws and five sizes of socket head nuts, and the No. 3 with 1/4 to 7/16-in. wrenches for 18 screw sizes and four nut sizes. At the present time, only the No. 2 toolholder is available. The wrenches are secure in the holder.

Versatile Band Machine Accommodates up to 20 Attachments

The DoAll Co., Des Plaines, Ill., has announced a 16-in. band machine with a 12-in. thickness capacity that can accommodate up to 20 attachments. Powered for tough, straight or curved metal sawing operations, the machine can be easily arranged for band filing, metal polishing and carbide finishing, as well as slicing of hundreds of other materials, by simply applying the



DoAll 16-Inch Band Machine equipped with various attachments

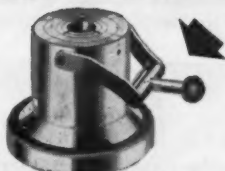
proper band tool, tool guides and attachments and accessories built for the machine.

The machine, intended for use in the toolroom or for light production work with standard band saw blades, incorporates the ruggedness and power to provide the cutting speed and finish needed for such applications. A heavy trunnion and cradle support the 24 x 24-in. work table, assuring the rigidity and area needed for handling heavy or large workpieces. The table

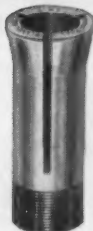
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now, bigger and
better handles on
Zagar FIXTURES



Zagar 2" holding fixture.



Zagar 5-C
pull type
collet.



Zagar 1" indexing fixture.

Not in itself a radical change, but illustrating an old, steady determination to keep on improving every Zagar product whenever possible. All the well known advantages of Zagar design: rigid holding, accurate construction, quality finish, and the dependability that goes with Zagar's 15-year-old standards. Also a complete line of air-operated holding fixtures and collet lathe chucks.

Ask for
New Bulletin S-6.

ZAGAR TOOL, INC.
24000 LAKELAND BLVD., CLEVELAND 23, O.

Zagar TOOLS For
INDUSTRY
and SPECIAL MACHINERY

tilts 45 degrees to the right and 10 degrees to the left. The saw blade welder handles blades up to 1/2 in. in width for welding and annealing. The machine is equipped with standard DoAll saw guides which can be interchanged with six other types for specialized sawing, including 90-degree angle guides for cutting off long pieces. The lower guide can be located above the table surface for trimming operations.

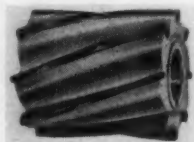
Of unusual importance is the machine design feature which permits the use of the numerous attachments

for "tailoring" the machine to a variety of applications, including standard contour sawing, filing and polishing operations and for specialized operations of various other kinds. The machine is available with fixed or variable speed controls with a speed range of between 50 and 5,200 ft. per minute.

Carbide Slab Mill Is Designed for Heavy Stock Removal

Designated as the Helicarb, a helical carbide slab mill which is designed for

heavy stock removal on wide slab cuts has been announced by Sonnet Tool & Mfg. Co., 576 N.



Sonnet Helicarb Slab Mill

Prairie Ave., Hawthorne, Calif. According to the manufacturer, the Helicarb design combines the efficient cutting action of true helical flute design with the hardness of carbide. The cutter is said to have the proper composite cutting angle established and held constant throughout the full width of the cutter. The design of the cutter, it is claimed, results

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Sevrance
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1/4" SHANK MIDGET MILLS
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DEBURRING
CUTTERS

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Order directly from this Ad, give: Tool No. and Centerline angle desired. Thus: 12 only CB-30°; 24 only GD-41°; etc.

TOOL NO	DIAMETER	SHANK DIA	PRICE
CB	1/4	3/16	1.30
EC	3/8	1/4	1.85
GD	1/2	3/8	2.40
JF	3/4	1/2	4.60
LI	1	1/2	7.00
PK	1 1/2	3/4	13.65
SM	2	1	20.50

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CUTTERS



TUBE
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CARBIDE
HAND FILES



SPECIAL CUTTERS

ASK FOR A SEVRANCE CATALOG TODAY!

Sevrance TOOL INDUSTRIES INC.

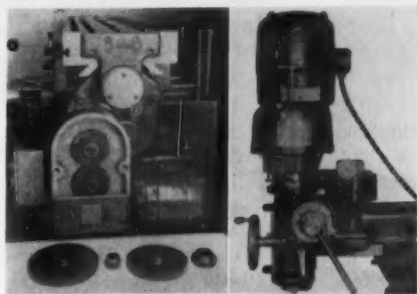
724 IOWA AVENUE

SAGINAW, MICHIGAN

in a unique shearing action that distributes the cutting load uniformly over the full length of the cutting edge. The mill is available in 3 and 4-in. diameters and in widths from 2 to 4 in., for both steel and non-ferrous cutting. Clearance on the end of the teeth permits machining of steps, shoulders and webs.

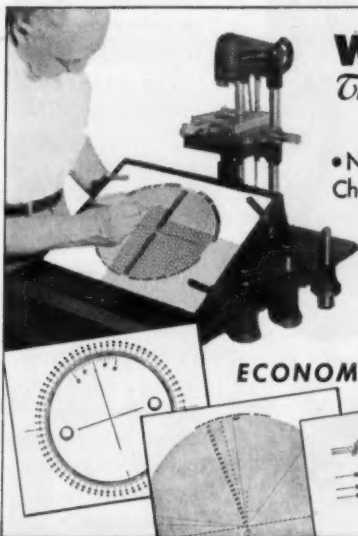
Power Feed Units for Fray Milling Machines

The Fray Machine Tool Co., 2935 N. Ontario St., Burbank, Calif., has announced two power feed units as accessories for its line of precision milling machines. The units are of two types; namely, a table unit for Models 10-R and 10-RH machines and a power down feed for the Type 4 All-Angle Milling Attachment. The table power feed is arranged for pick-off gears from $\frac{1}{2}$ to 13 in. and includes a 1/3-h.p. motor built right into the unit.



(Left) Close-up view of Fray Table Power Feed Unit. (Right) Fray Power Down Feed Unit mounted on vertical head

The unit can be attached to the saddle of the machine, thus providing rigidity. The head power feed unit is arranged for three feeds—0.0015, 0.003 and 0.006 in. per revolution. According to the manufacturer, the attachments are designed to increase the flexibility of the machine and to speed up production.



WILDER PROJECTOR The MICRO-PROJECTOR with the VERTICAL DESIGN

- New Gage Company Precision Plastic Comparator Charts made on non-changing, unbreakable material; available for 360° angular checking, radii, threads and special charts to your specifications.
- The Wilder so equipped will inspect faster, more accurately, without the need of to-scale manually built drawings.

ECONOMY • ACCURACY • MODERATE PRICE

Geo. SCHERR OPTICAL TOOLS, Inc.

200-MM LAFAYETTE ST. • NEW YORK 12, N.Y.

Electrode Features Powdered Metal Coating

The Lincoln Electric Co., Cleveland 17, Ohio, has announced the second electrode in its newly developed line of electrodes with powdered metal in their coatings. Designated as "Jet-weld" 2, the electrode is designed especially for welding butt and deep groove joints. According to the manufacturer, the electrode provides low cost per foot weld with excellent x-ray

qualities, easy slag removal, unusual physical properties, smooth appearance and low crack sensitivity. By utilizing a powdered metal coating, the manufacturer states that, first, an additional source of metal is available to permit high deposition rates at usable currents and, second, the problems created by the excessive amount of heat in the arc are eliminated. Powdered metal in the coating is said to be the additional source of metal,

and the excess heat available in the arc is used to melt this metal, thus making possible fast speeds without too much penetration, gouging of the parent metal, undercutting, spatter, overheating of the electrode coating or other such difficulties.

The electrode operates on either a.c. or d.c., with a.c. operation preferred. The bead, it is claimed, has unusual wash-in, and slag removal is excellent. Spatter is said to be reduced to a minimum, and the smooth appearance on cover pass welds meets automatic welding standards. The electrode is available in 5/32, 3/16, 7/32 and 1/4-in. diameters.

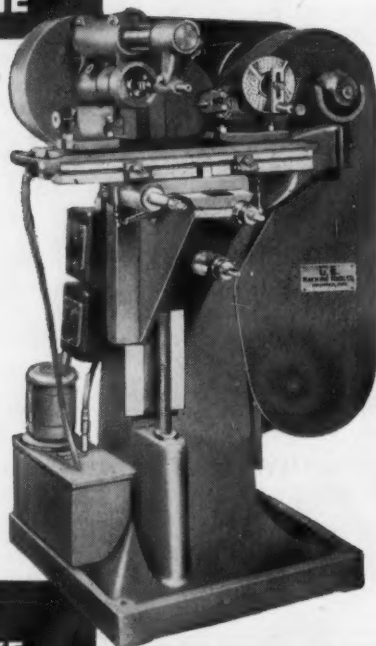
"U.S." No.1 HORIZONTAL MILLING MACHINE

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America's
Number One
Low Cost
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A Rugged
precision
hand-miller
easily
adapted to
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hand or
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Send for
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MACHINE TOOL DIV.

Brotherton Road 3,
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★ ★ ★ ★ ★ ★ ★

Machine Grinds Crankshaft Points on Drills

A machine which is said to provide a fast, accurate method of grinding crankshaft points on drills ranging in size from No. 1 through No. 50, A through U, and 3/64 through 3/8 in. has been announced by Union Twist Drill Co., Athol, Mass. In operation, the drill is rocked into the wheel to grind one notch, returned and indexed 180 degrees. The operation is then repeated for the other notch. An adjustable diamond truing device trues the wheel with one quick motion. The machine utilizes a motorized, precision ground, preloaded ball bearing spindle which accommodates a 6-in. grinding wheel at one end and a 6-in. general utility wheel at the other end. Powered by a 1/4-h.p. 110-volt 60-cycle, 3,450-r.p.m. fully-enclosed motor, the machine requires a bench space of 19 x 12 inches.

According to the manufacturer, the

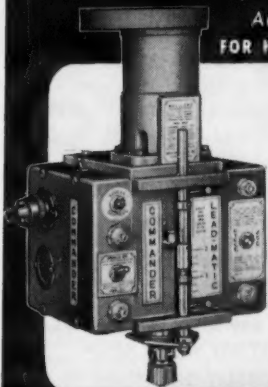


Union Crankshaft Drill Point Grinder

crankshaft point is well suited for deep hole drilling and for drilling stainless steel and tough alloy materials.

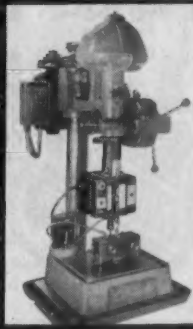
Commander LEAD-MATIC Tapper

Automatic Tapper with Lead Screw
FOR HIGH PRODUCTION PRECISION TAPPING



- Precision Ground Lead Screws Assure Finest Threads
- Electrically Controlled Cycle or Jog Tapping Action
- Hand, Foot or Fixture Switch Control
- Easily Adapted to Any Drill Press
- Range #0 to 3/4"

Built for high production tapping . . . precision or otherwise, the Commander LEAD-MATIC Tapper makes any drill press a precision tapping unit, even with inexperienced operators. Electric control of Cycle or Jog tapping action provides versatility to handle any job . . . automatic tap reversal eliminates drill press motor reversing and speeds tapping. Compact, ruggedly built, easy to operate, the Commander LEAD-MATIC Tapper will cut your tapping costs and reduce rejects to a minimum.



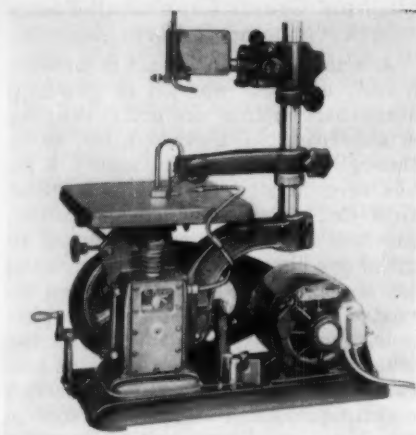
Write for illustrated circular and name of nearest Distributor.

Commander MFG. CO.

4224 W. KINZIE ST. • CHICAGO
PRODUCT OF COMMANDER . . . BUILDER OF PRODUCTION TOOLS

Machine Performs Precision Filing, Sawing and Honing Operations

All American Tool & Mfg. Co., 8043 Lawndale, Skokie, Ill., has announced a die filing machine which is said to be capable of performing a wide variety of precision filing, sawing and honing operations. According to the manufacturer, an infinitely variable speed V-belt drive permits operation at any desired speed from 170 to 470



All American Precision Die Filing Machine

Columbia

TOOL STEELS for
all tools for all purposes



**HOT WORK-
SHOCK RESISTING:**

Formite
Fredie

Formite No. 2
Buster C.E.C.



**COLUMBIA TOOL
STEEL COMPANY**

Main Office & Works
Chicago Heights 6, Ill.

strokes per minute, depending upon the operation and type of material being machined or finished. The machine incorporates two overarms. The larger arm has a heavy clamp for holding the saw, file or hone. The head has an adjustable spring-loaded reciprocating shaft which is said to exert sufficient tension on the tool to prevent deflection, regardless of the pressure of the workpiece. The auxiliary overarm is also adjustable and provides for holding down the workpiece. A fiber or steel roller absorbs the pressure of the work against the tool. Both arms can be removed or positioned on the vertical post and locked in place.

A four-faced file-setting square is

HI-LO

Variable Speed Pulleys provide a most efficient and inexpensive speed control for all types of machinery. A patented feature of Hi-Lo Pulleys is the cam action within the pulley which automatically regulates belt tension actually required to carry the load. Hi-Lo Pulleys maintain constant speed at any speed setting. Hi-Lo Pulleys use standard V belts, obtainable at any supply house.

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EQUIPMENT ENGINEERING CO.

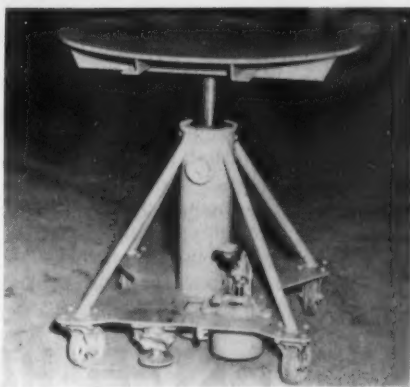
2855 COLUMBUS AVE.

MINNEAPOLIS 7, MINN.

utilized. One face has a precision ground V-groove for file squaring purposes, and the other three faces are finished to 0, $\frac{1}{2}$ and 1-degree angles for table setting purposes. A 2 $\frac{1}{2}$ -power illuminating magnifier for close work is available as optional equipment.

Elevating Table Features Revolving Top

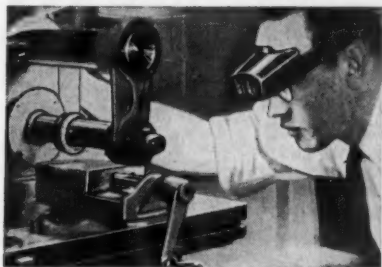
The Raymond Corp., 88-121 Madison St., Greene, N. Y., has designed a round top for their standard table to solve the problem of providing an adjustable table that could be turned and elevated to serve several conveyor lines. The top revolves freely or can be locked in a single position. A 16 in. range of height is provided, allowing the top to be fixed at any height between 28 and 44 inches. The table has a capacity for 2,000 pounds.



Raymond Elevating Table

The unit is portable but can be held in position by a floor lock. Hydraulic elevation and lowering is controlled by convenient foot pedals on the pump which is mounted on the base of the table.

People work better when they SEE BETTER



In Bell Telephone Laboratories:
Precision machinist working on a milling machine finds Magni-Focuser an invaluable seeing aid.

MAGNI-FOCUSER's

matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

MAGNI-FOCUSER

SPEEDS PRODUCTION

Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

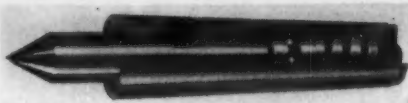
Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

EDROY PRODUCTS CO. 480 Lexington Ave.,
Dept. P, New York 17, N. Y.

Improved Live Center Eliminates "Cold Weld" Problem

Nirol Mfg. Co., 100 U. S. Highway 22, North Plainfield, N. J., has announced an improvement in the design of its live center that is said to eliminate the "cold weld" problem. The improved center embodies only five movable parts, excluding such parts as screws, lock rings, and so on. According to the manufacturer, the center reduces overhang, thus minimizing vi-



Nirol Improved Live Center

bration and chatter. High radial and thrust loads are accommodated by three sets of bearings within the center. Two sets of needle bearings encompass the spindle, maintaining ro-

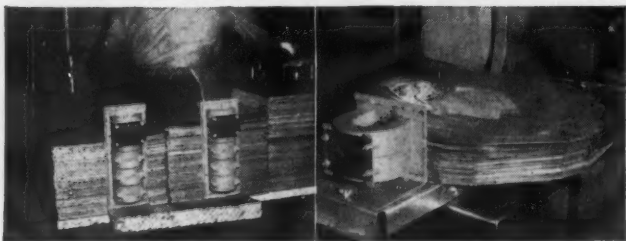
tation accuracy to within 0.0002 inch. A ball-type and thrust bearing is said to further increase the capacity of the center to withstand heavy loads. The remaining movable part is a powerful pressure spring which is claimed to automatically compensate for work expansion and contraction due to heat, thus avoiding continual resetting of the tailstock and eliminating cold weld.

The center is available in all standard sizes with either standard taper or straight shanks for use on lathes, milling machines and grinders. Special sizes or tapers can be supplied on special order to meet individual requirements.

SHEET STEEL HANDLING

can be fast and easy when you use

Verson SHEET FLOATERS



The Verson Sheet Floater eliminates the need for hand separation of sheets and blanks—the hard part of feeding sheet steel to presses, brakes, shears, etc. By magnetic action, the Sheet Floater forces the pieces apart—causes them to fan out for easy handling. This speeds up the feeding operations, reduces operator fatigue, and releases manpower for other jobs. Available in standard and heavy duty models for handling rectangular, round or irregular shaped pieces. Write for further information and prices.

A Verson Press for every job from 60 tons up.



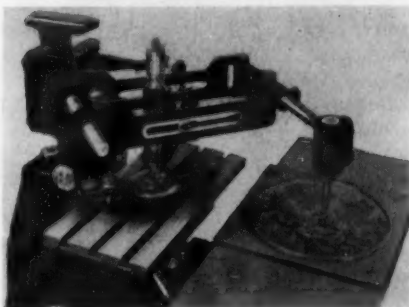
**VERSON ALLSTEEL
PRESS CO.**

9310 S. Kenwood Ave., Chicago 19, Ill.

So. Lamar at Ledbetter Dr., Dallas, Tex.

Three-Dimensional Engraver Has Ratios from 1.7:1 to 7:1

Designated as the "Preis-Panto" Model 3D-5, a three-dimensional en-



"Preis-Panto" Model 3D-5 Engraver

graving machine which can engrave steel, other metals, plastics, wood and similar materials in ratios ranging

from 1.7:1 to 7:1 has been announced by H. P. Preis Engraving Machine Co., 188 Industrial Branch, Hillside, N. J. The machine can also be used for engraving enlargements in the reverse of the above ratios by simply alternating the spindle and tracing stylus. High precision engraving within the limits of a 4½-in. diameter circle at 2:1 ratio and within a 1½-in. circle at 7:1 ratio can be accomplished at any of four spindle speeds; namely, 5,000, 7,000, 9,000 and 12,000 revolutions per minute.

The overall size of the engraver is 23 in. long x 48 in. high x 19 in. wide. The machine is furnished complete with a 1,725-r.p.m. ball bearing motor and all standard attachments, including work table, clamps, copy holder, spindle, collet, belts, pulley, cutters, grease gun, wrenches and full operating instructions.

A Production Giant!

NEW DURO 18" DRILL PRESS HAS "LONGER LIFE" BUILT IN

Big in size, big in capacity, big in production. This streamlined Duro 18" Drill Press is worth investigating. It's a completely modernized drill press designed to meet industry's current demand for more efficient cost cutting equipment. Performs multiple operations faster, with dependable accuracy, for longer periods. These special exclusive "built in" features will convince you: Has precision ground alloy steel spindle; 4 ball bearings sealed and permanently lubricated; precision bored bearing seats assure perfect alignment; massive close grained head casting eliminates vibration; sturdy cast hinged belt and pulley guard; easily adjustable feed tension with pin for positive positioning; table raising mechanism; with or without foot feed; plus many other features.

Write today for full details

and catalog on the complete line of drill presses in 32 models.

World's Largest Manufacturers of Power and Hand Tools (Duro-Chrome)

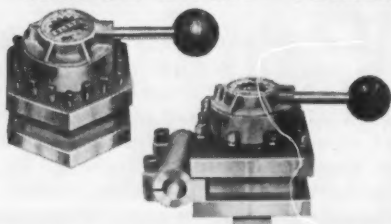
Duro Metal Products Co. 2654 NORTH KILDARE AVE. CHICAGO 29, ILL.



Machine Is Designed for Wet or Dry Grinding

Designated as the Model WD-6, a wet or dry carbide tool grinder which utilizes a safety cup disc that completely fills the open cup of the wheel and prevents hand injuries and dropping of a tool into the cup of the wheel has been announced by Hammond Ma-

"WEDGE-LOCK" TURRET



Does not raise up when indexing in all 12 positions. 4-way and 6-way block models. Repetitive accuracy to within .0003 plus or minus within itself.

WRITE FOR FOLDER

Makers of Combination Rotary Tables and Angle Plates. Also Helical Gear Speed Reducers, Single and Double Reduction. Also Special Gears of All Types.

Open territory available to representatives.

OLSON INDUSTRIAL PRODUCTS, INC.

40 W. WATER ST. • WAKEFIELD, MASS.



Hammond Model WD-6 Wet or Dry Carbide Tool Grinder

chinery Builders Inc., 1615 Douglas Ave., Kalamazoo, Mich. Guards prevent coolant escape, and a self-contained pump and tank unit mounted in the base of the machine provides a constant flow of coolant. To compensate for wheel wear, the tables adjust "in" and "out" by means of a screw feed. According to the manufacturer, the wheels can be quickly and easily changed, and two operators can grind tools at the same time with freedom of movement and unobstructed vision.

SPECIFICATIONS

Size 9"x16"

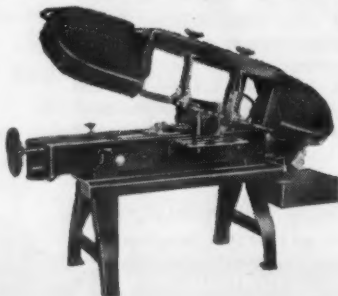
Blade Size
3/4"x.032x11'6"

Floor Space
20"x66"

Blade Travel 60, 90
and 120 ft. per
minute

Swivel Vise 45 de-
grees in either
direction

Wt. Appr. 500 lbs.



For BIG Savings at little cost

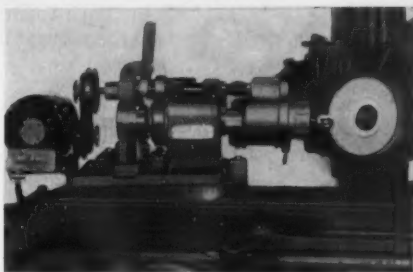
... investigate this new Model H hinge-type saw, the economy model in W. F. Wells & Sons' line of metal cutting equipment. One-piece frame lowers hydraulically. Coolant system and other accessories available. Send for literature today.

W. F. WELLS & SONS
Three Rivers, Mich.

Circularity Grinding Attachment Is Fast and Easy to Handle

Designated as the Model 500, a circularity grinding attachment which is said to be fast and easy to handle and which has positive control has been announced by Detroit Reamer & Tool Co., 2830 E. Seven Mile Rd., Detroit 34, Mich. The motor-driven attachment, it is claimed, simultaneously revolves the work to be ground and moves it longitudinally back and forth. This simultaneous operation is said to be the result of direct gear drive from the drive shaft to the collet housing gear and spacer gear. Standard spacer gears with a follower pin for each flute to be ground provide indexing for 2, 3, 4, 6, 8 or 12 flutes. Special spacer gears can be provided. The back and forth movements per revolution of work are controlled by the number of follower pins used.

According to the manufacturer,



Detroit Model 500 Circularity Grinding
Attachment in use

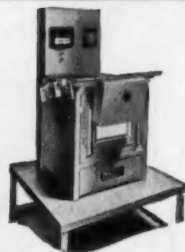
simple, speedy setups on the attachment permit fast and easy grinding of form relief, radial relief, form and radial relief together, tapered cylindrical and straight cylindrical. The cutting tool to be produced or reworked is held in a collet or between dead centers and revolves on its own axial center. Where the full length of

COOLEY HEAT TREATING FURNACES

ELECTRIC BOX TYPE • FLOOR AND BENCH MODELS
For Tools and Small Parts

SHOWN HERE

THE COOLEY BENCH MODEL
for HARDENING AND TEMPERING



Max. Temp.	Sizes	Price
1850°	8" x 6" x 14"	\$255 to \$655
	10" x 6" x 18"	
	10" x 8" x 18"	
2000°	8" x 6" x 14"	\$655
	10" x 6" x 18"	

All prices are less controls. Any standard controls available for automatic temperature control.

- Available with hinged or vertical lift door.
- Heating elements fully protected from mechanical or atmospheric destruction.

Controlling Pyrometers carried in stock—available for all applications.

Free on request: ☐ COMPLETE CATALOG ☐ "SHOP NOTES ON HEAT TREATING"

COOLEY **ELECTRIC MANUFACTURING CORP.**
34 50. SHELBY • INDIANAPOLIS, IND.

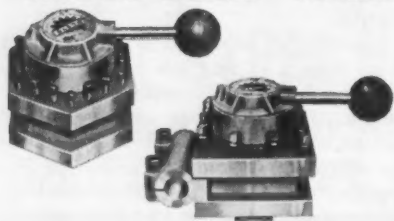
Machine Is Designed for Wet or Dry Grinding

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Hammond Model WD-6 Wet or Dry Carbide Tool Grinder

"WEDGE-LOCK" TURRET



Does not raise up when indexing in all 12 positions. 4-way and 6-way block models. Repetitive accuracy to within .0003 plus or minus within itself.

WRITE FOR FOLDER

Makers of Combination Rotary Tables and Angle Plates. Also Helical Gear Speed Reducers, Single and Double Reduction. Also Special Gears of All Types.

Open territory available to representatives.

OLSON INDUSTRIAL PRODUCTS, INC.

40 W. WATER ST.

WAKEFIELD, MASS.

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SPECIFICATIONS

Size 9"x16"

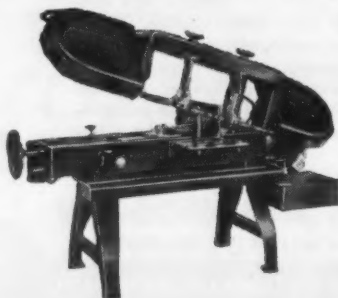
Blade Size
3/4"x.032x11'6"

Floor Space
20"x66"

Blade Travel 60, 90
and 120 ft. per
minute

Swivel Vise 45 de-
grees in either
direction

Wt. Appr. 500 lbs.



For BIG Savings at little cost

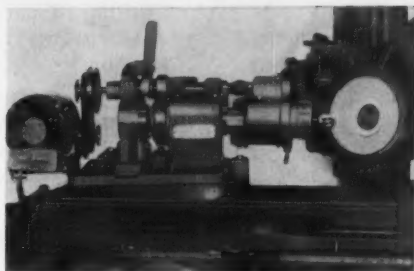
... Investigate this new Model H hinge-type saw, the economy model in W. F. Wells & Sons' line of metal cutting equipment. One-piece frame lowers hydraulically. Coolant system and other accessories available. Send for literature today.

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Detroit Model 500 Circularity Grinding Attachment in use

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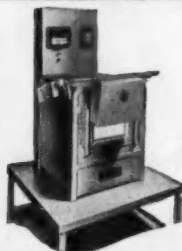
COOLEY HEAT TREATING FURNACES

ELECTRIC BOX TYPE • FLOOR AND BENCH MODELS

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**THE COOLEY BENCH MODEL
for HARDENING AND TEMPERING**



Max. Temp.	Sizes	Price
1850°	8" x 6" x 14"	\$255 to \$455
	10" x 6" x 18"	
	10" x 8" x 18"	
2000°	8" x 6" x 14"	
	10" x 6" x 18"	

All prices are less controls. Any standard controls available for automatic temperature control.

- Available with hinged or vertical lift door.
- Heating elements fully protected from mechanical or atmospheric destruction.

Controlling Pyrometers carried in stock—available for all applications.

Free on request: ☐ COMPLETE CATALOG ☐ "SHOP NOTES ON HEAT TREATING"

COOLEY

ELECTRIC MANUFACTURING CORP.
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the tool is to be ground for both form and radial relief, the attachment travel is similar to an o.d. grinder.

Floating Holder Provides Powerful, True Collet Action

A "lock-and-eject" type floating holder, for use on multiple spindle reaming and tapping machines, which is said to provide a powerful, true collet action on the shank of the cutting tool has been announced by Scully-

Jones and Co., 1909 S. Rockwell St., Chicago 8, Ill. According to the manufacturer, the holder combines the advantages of unrestricted float with easy, fast insertion and ejection of tools. A threaded nut on the nose of the holder revolves freely on ball bearings, drawing the threaded chuck into the taper seat and compressing it evenly on the shank of the tool. Four-split tap chucks are said to provide a powerful, accurate collet action. Reamer chucks are split on two sides. Drifting

is not necessary to remove the tap or reamer. The operator merely twists the threaded nut in the re-

Got a Minute? Got a Penny?



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— any keyway from $\frac{1}{16}$ " to 1" in any bore from $\frac{1}{4}$ " to 3" — by hand with arbor press, when you're equipped with Minute Man Keyway Broach Kits.

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Scully-Jones, "Lock-and-Eject" Type Floating Holder

verse direction, easily ejecting the tool from the chuck.

Holders of special design to compensate for spindle feed and tap pitch variations are available. Three standard sizes with a range of adjustable adapter shanks can be supplied.

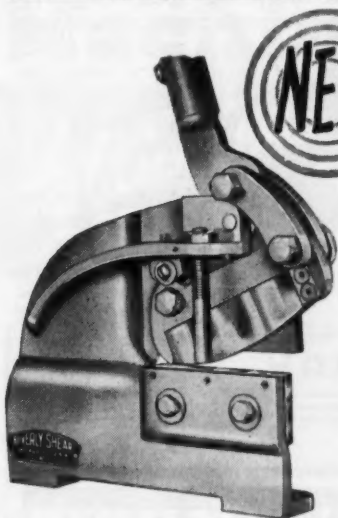
Machines Are Designed for Automatic Welding of Precious and Semiprecious Metal

Both disc and point type automatic welding machines which are designed for high speed, automatic welding of precious and semiprecious metal contacts to leaf springs, small contact arms and other instrument components have been announced by The Sheffield Corp., Dayton 1, Ohio. Gold, silver, platinum, palladium and iridium are a few of the metals used for the weld. Point contacts may vary in shape from a small pin point up to a dome shape of 0.070-in. diameter at the base and a height of 0.060 inch. The point welder can handle a wire diameter from 0.022 in. up to a maximum of 0.075 in. on fine silver. Location accuracy of contacts, it is claimed, can be held plus or minus 0.001 inch. Discs can vary in diameter from 0.025 to 0.187 in. in fine



Sheffield Automatic Contact Welding Machine

silver, or to 0.125 in. in other materials. Thickness of the disc could range from 0.005 to 0.030 or 0.040 in., depending upon the diameter. Each



SS-3 3/16" slitting cap;
5/16" trimming; 1/4"x2"
bar capacity.



Beverly SLITTING SHEAR

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EXCLUSIVE DESIGN . . . Cleaner Cuts
RUGGEDLY BUILT . . . Last a lifetime
CAPACITIES TO 3/16"**

Get faster, easier slitting and trimming with a new design Beverly "SS" Series Slitting Shear. Rigid, strongly braced frame; compounded linkage and extra strength where needed. Many exclusive features. Write for FREE illustrated Bulletin.

*See your Beverly Distributor today.
Ask for a demonstration—no obligation.*

Beverly SHEAR MFG. CO.

3000 W. 111th STREET • CHICAGO 43, ILLINOIS

type machine has a production rate of from 1,200 to 2,400 contacts per hour, according to the operator's ability to load the parts into the welding station.

Welding current is controlled with a Thyatron unit, enabling the user to select at will a welding current of from one to 10 cycles as required by the particular size and shape of the contact.



We mean the tips on those new Smith's Welding Torches. They swivel to any angle you want while flame stays burning! You don't need to shut off gas or stop your work:

Just turn the tip to a new angle and away you go!

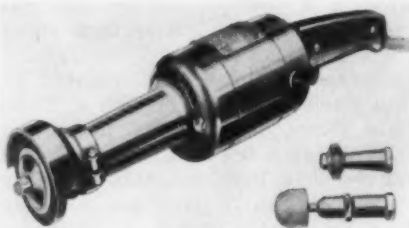
Drop us a card — we'll tell you more.

SMITH WELDING EQUIPMENT CORPORATION

Dept. MMS-101 2633 S. E. 4th St. Minneapolis, Minn.

Redesigned Hand Grinder Is Designed for Heavy-Duty Production Jobs

The Dumore Co., 1311 Seventeenth St., Racine, Wis., has introduced a



Dumore Redesigned Series 9 Hand Grinder

completely redesigned version of its Series 9 Hand Grinder which is intended primarily for heavy-duty production jobs, such as cleaning castings and weld seams, spark testing steel and polishing and grinding heavy and irregular work. A $\frac{1}{4}$ -in. capacity chuck for use with mounted wheels in grinding tight spots, radii, die molds, and so on, is furnished. The redesigned grinder is said to be powerful, compact and well balanced, and a rifle-type handle grip provides easy operation. The grinder utilizes a $\frac{1}{4}$ -h.p. continuous-duty-rated universal motor which develops 15,500 r.p.m. The motor is available for 115 or 230-volt, d.c. or a.c., 0 to 60-cycle operation. The grinder weighs 6 lb. 14 ounces.

HIGH

SPEED

DRILLS

FLAT TWISTED AND ROLLED SECTION

Special Lengths and Types. Prompt Delivery.

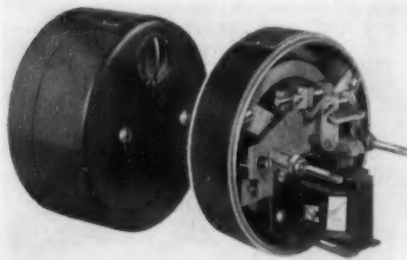
Manufacturers Since 1903

HI-DUTY DRILL WORKS

FLEETWOOD, PA.

Magnetic Brakes for Fractional Horsepower Motors

Stearns Magnetic, Inc., 664 S. 28th St., Milwaukee 46, Wis., has introduced



Stearns Magnetic Disc Brakes

ed a line of 40 Series and 50 Series magnetic disc brakes for fractional horsepower motors. The 40 Series brake is designed to meet the new N.E.M.A. frame standards in the 1/20

to 1/8-h.p. range. The brake measures 5 in. in diameter, less than 3 3/4 in. long and has a torque range of from 6 lb. in. to 1 lb. ft. It is designed for mounting on the standard N.E.M.A. C and bell for motor frames 42-C and 48-C and is also available for floor mounting independent of the motor.

The 50 Series brake is designed for re-rated N.E.M.A. frames in the 1/6 through 2-h.p. motor range. It is available in four torque ratings; namely, 1 1/2, 3, 6 and 9 lb. ft. The brake is designed to mount on new fractional horsepower motor frames 56-C and 66-C and integral horsepower motor frames 182 and 184.

Dializer Is Available with 1 3/4 or 2 1/2-Inch Diameter Indicator

Used to convert standard (A.G.D.) adjustable limit snap gage frames to dial snap gages, the Dializer offered

Machine Bases

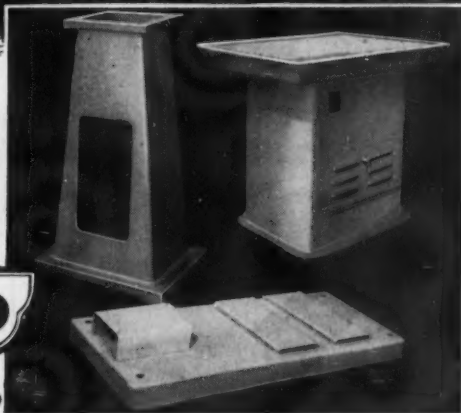
Fabricated TO SPECIFICATIONS

There's no substitute for "Accuracy" in the fabrication of Plate and Sheet Metal products, nor is there a substitute for "Experience" in the forming and welding of such products. With Littleford you can be assured of accuracy and experience in the fabrication of Machine Bases, Guards, Pans and Louver Covers. Littleford has been serving industry since 1882 and these years of skill and "know how" are ready to serve you too. See how fabricated bases can save you money. Send your blue prints for an estimate of cost or write for the Bulletin on Bases.



LITTLEFORD

LITTLEFORD BROS., INC.
433 E. Pearl St., Cincinnati 2, Ohio



by Standard Gage Co., Inc., Poughkeepsie, N. Y., is now available with either a 1½ or 2¼-in. diameter indicator, in addition to the 1½-in. diameter indicator previously announced. According to the manufacturer, the Dializers now afford a wider choice of graduation values and make it possible to select a size of dial appropriate to the operation. The smaller indicators are hooded, and the larger ones have protective guards so designed as to

allow the gage to be placed on either side or stood on its end without resting on the indicator case. The Dializer

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QUARTER TURN SCREWS
SHOULDER SCREWS
DOUBLE END JIG FEET
SCREW TYPE JIG FEET
PRESS TYPE JIG FEET
FLANGED NUTS
CUT THREAD STUDS
TEE-NUTS
COUPLING NUTS
ADJUSTABLE STEP BLOCKS
STAR TYPE HAND KNOBS
HEXAGON TYPE HAND KNOBS
KNURLED HEAD SCREWS

T-NUT & STUD SETS
STEP BLOCK SETS
PUNCH PRESS SETS

Northwestern
119 HOLLIER AVE., DAYTON 3, OHIO

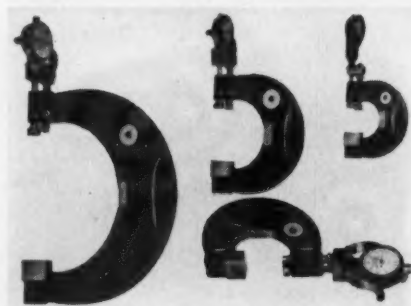
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SPECIAL MACHINE PARTS
WOODRUFF KEYS
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GROOVE PINS

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2542 SOUTH 50th AVENUE • CICERO 50, ILLINOIS



Standard Gage Dializers in snap gage frames

bodies are produced in three sizes to conform to the different hole spacings, depending on the size of frame, in the A.G.D. standards. Any one of the three sizes may be equipped with any of the three indicator sizes.

Dialized snap gages can be made up from A.G.D. snap gage frames of any make to measure diameters up to 11½ inch. With frames above the A.G.D. range, but available from Standard Gage, larger diameters up to 26½ in. can be measured. The Dializers, it is claimed, can also convert A.G.D. adjustable limit length gages to dial instruments which can be used for internal and external measurements if the progressive type is used.

EISLER CAM MILLING
JIG BORING

A SPECIALIZED CAM
MILLING SERVICE...
JIG BORING... SPOT
WELDING... CON-
TRACT PRODUCTION
... EXPERIMENTAL DEVELOPMENT





EISLER ENGINEERING CO., Inc.
734 So. 13th St. Newark 3, N. J.

Improved Stagger Tooth and Half Side Mills Feature Dual-Wedg Locks

Recommended for most general purpose straddle, face, gang milling and slotting operations, a series of improved stagger tooth and half side milling cutters featuring Dual-Wedg Locks has been announced by Wesson Co., 1220 Woodward Heights Blvd., Ferndale (Detroit 20), Mich. The cutter, employing the Dual-Wedg Lock, consists of a hardened steel body,

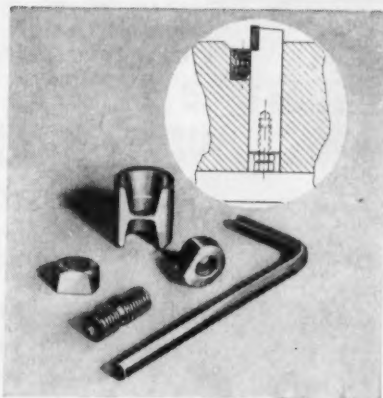


Illustration showing Dual-Wedg Lock used in Wesson Stagger Tooth and Half Side Milling Cutters

broached blade slots and replaceable blades.

Both of the blades, tipped with carbide, and the cutter body are serrated for ease of adjustment. The 60 degrees x 1/32 pitch serrations, it is claimed, also make finer positive adjustment possible. The Dual-Wedg Locks slip easily into a cylindrical recess in the body and the two wedges are locked on the face of the blade by several turns of the lock lead screw. According to the manufacturer, the lock seats itself both axially and radially, even if the blade being locked has a step, is out of square or slightly tapered.



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Take advantage of these

SUBSTANTIAL SAVINGS



by using Whitehead Stock Washer Dies.

1500 SPECIAL SIZE DIES ON HAND.

Whitehead makes washers and shims from any metal or special material to your specifications. Thickness from .002" to $\frac{3}{8}$ ".

In stock: S.A.E. standard light, medium, and heavy steel washers; brass and copper, small and large patterns; bolt sizes. Write for Whitehead's Catalog.

54-3



**WHITEHEAD
STAMPING CO.**

1673 W. Lafayette Blvd.
Detroit 16, Michigan

Longer cutter body life is said to be assured with the self-contained Dual-Wedge Lock since the moving members do not wear on the tool body recess. The wedges lock on the face of the blade. The stagger tooth and half side milling cutters are available in diameters of 5, 6, 8, 10 and 12 inches. Standard widths of both type cutters, determined by blade widths, are $\frac{3}{8}$, $\frac{1}{2}$, 1, $1\frac{1}{4}$ and $1\frac{1}{2}$ inches.

YESTERDAY'S PIONEER . . . TODAY'S LEADER



WELDON

T-SLOT CUTTERS

● You can increase your production through the faster feed possible with these Weldon T-Slot Cutters. They have far greater

chip room than is usually found in a T-Slot Cutter. Their straight shanks fit Weldon Holders, and their initial cost is far less than taper shank type cutters.

Weldon distributors throughout U. S. A. and Canada carry complete stocks to serve you.

WRITE FOR LATEST CATALOG NO. 10.

THE WELDON TOOL CO. *Cleveland 4, Ohio*



3000 WOODHILL ROAD

Measuring Tape Is Woven of Tough Non-Metallic Fiber

Designated as the "Hi-Line," a measuring tape which is woven of a tough non-metallic fiber has been announced by the Lufkin Rule Co., Saginaw, Mich. According to the manufacturer, the tape has unusual dimensional stability even after it has been repeatedly soaked and dried. Markings are protected by coatings of specially

compounded plastic which is said to be resistant to abrasion, cracking, mildew, moisture and temper-

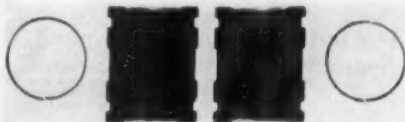


Lufkin "Hi-Line" Non-Metallic Woven Measuring Tape

ature changes. The case is hand stitched leather. The first end of the tape, the point of greatest wear, is reinforced with durable green plastic, and the last preceding foot number is repeated in red at each inch. Total reading is at the point of measurement. The tape is said to be ideal for power, utility and general work around high tension circuits.

Adapter Bushing Frees Tool When Set Screw Is Released

Precision Steel Products, Inc., Stop Eight Rd., Route 5, Dayton 4, Ohio, has announced an adapter bushing



Precision Adapter Bushing and Springs

which is said to release the tool in the bushing when the set screw is released, thus eliminating the driving of tools in or out of the holder. Two flat circular springs lock the bushing halves in place. According to the manufacturer, there is no end movement or separation. The spring tension on the bore enables the setting

of the drill to depth with a gage. Each bushing is plainly stamped for size of bore to provide efficient handling and storage. The bushing, it is claimed, is heat treated for long wear with no distortion or burning.

Air Impact Hammer Features Air Trip Mechanism

Mead Specialties Co., Dept. A T-42, 4114 N. Knox Ave., Chicago 41, Ill., has announced that a more effective method of releasing the hammer blow has been incorporated in its air impact hammer. Whereas formerly spring tension on a trigger mechanism released the piston, now the same result is accomplished by air pressure. The force of the blow is said to be increased because greater resistance can be obtained by air pressure. Adjustment of the force of the hammer blow can be made while the hammer

Chicago

MOUNTED

Wheels

... now
even better with
79E BOND

Three grinding wheels of different sizes are shown, each mounted on a metal shaft. The wheels have a dark, textured surface, likely the 79E Bond material. They are arranged diagonally from the top right towards the bottom left.

**the new miracle
grinding wheel bond**

Greatest selection of sizes and shapes for every application. Best of all, deliveries are good . . . ready when you need them.

Try Chicago Mounted Wheels—bonded with 79E Bond—and you'll never buy any other! This tough new grinding wheel bond, exclusive with Chicago Wheel, has taken the industrial world virtually by storm, doing a better grinding job faster.

CHICAGO WHEEL & Mfg. Co.

Dept. MMS, 1101 West Monroe St., Chicago 7

is in action, enabling the operator to "tune" the impact to the amount required for the work to be done. The hammer derives its force from expanding compressed air. The mechanism consists mainly of a piston in a cylinder. When compressed air is admitted to the cylinder, it expands and drives the piston downward.

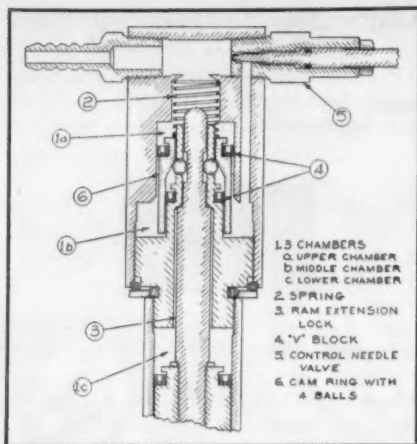
The force of the blow can be regulated by varying the length of the



OK
T-slot Bolts

The world's best . . . one-piece, drop-forged—not welded—of mild carbon steel, heat-treated, with head accurately milled for standard tables on lathes, planers, boring mills, milling machines. Integral washer and nut. Sizes: up to 30". Typical direct prices for 10" lengths: 1/2"—\$1.36; 3/4"—\$1.36; 1"—\$1.58; 1 1/4"—\$1.89. Write for price list.

THE O K TOOL COMPANY, INC., Milford 4, N. H.



Planograph drawing of Mead Air Trip Mechanism

stroke. This is done by moving the air cylinder up or down on its supporting column. Air is admitted into an air chamber under pressure. A trip mechanism holds the ram and piston motionless until the air pressure reaches its predetermined pressure. When the pressure in the lower chamber becomes greater than the pressure in the upper chamber, the ram and piston are released, driven downward by the expansion of the trapped air. The pressure in the trip mechanism is adjustable. As the air pressure is raised, the impact is increased, and conversely.

R E I D

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MALLEABLE MACHINE HANDLES



CRANK
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OFFSET

Finest and most complete available. Made in 3 styles and in a large variety of sizes. Well proportioned. Neat in appearance. Smooth finish. Stands up under severe usage. Low prices. ALSO plastic and steel ball handles. C.I. hand knobs, compression springs, etc. Finest quality. Low prices.

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Muskegon Heights, Michigan

JIG BORING

and

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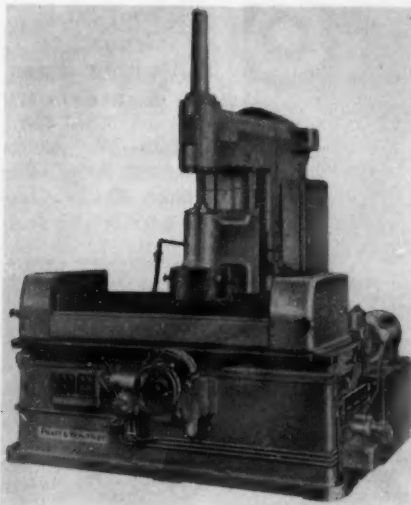
Done to your specifications

We Have 13 Jig Borers

BLOOMFIELD TOOL CORPORATION
37 FARRAND ST. BLOOMFIELD, N. J.

Surface Grinder Has High Table Speeds

Designated as the Model D, a 14-in. hydraulic vertical surface grinder which is rigidly designed throughout and which has high table speeds has been announced by Pratt & Whitney, Division Niles-Bement-Pond Co., 25 Charter Oak Blvd., West Hartford 1, Conn. The machine is available in either a 14 x 36-in. or 14 x 60-in. size with solid ring wheel or 17 x 36-in. or



P&W Model D Hydraulic Vertical Surface Grinder

17 x 60-in. size with segmental wheel. The heavily ribbed bed of the machine provides maximum support to the table and column. Wide wheel head ways, together with an unusually long column bearing, give the spindle head additional support. The spindle features a rigid bearing construction, and the wheel flange is an integral part of the spindle.

The table traverse is operated by two hydraulic cylinders, and speed is controlled by metering the oil in the return lines. The hydraulic sys-

Strength with Economy **HARGRAVE**

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Junior
Clamps



**FORGED STEEL
HEAT TREATED**

This new line is the answer to a growing need for **MORE STRENGTH, LONGER LIFE** and greater value for the money invested. They are rapidly becoming the favorite clamps of industrial users everywhere. Forged steel, heat-treated frames make **SUPER-JUNIOR** Clamps much stronger than pressed steel clamps, malleable, aluminum and other cast clamps on the market. They are much more economical to use on practically all classes of work.

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TOOLS

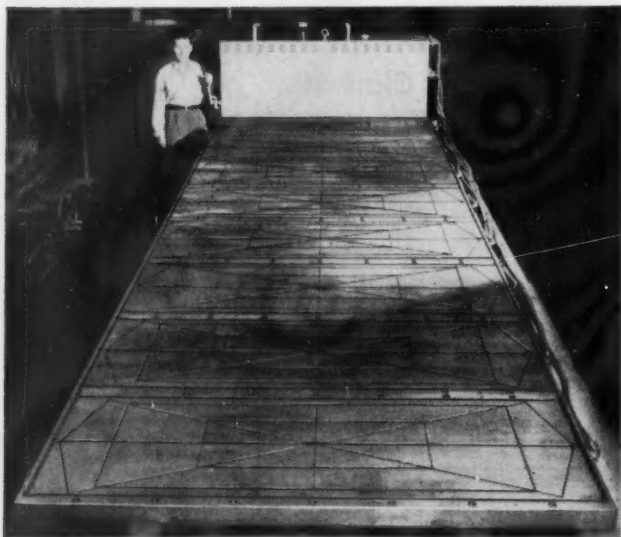
HARGRAVE
Tool Company
The Cincinnati Tool Company



tem consists of a 50-gal. reservoir equipped with a 30-g.p.m. variable delivery pump having an automatic control that meters the flow according to the speed desired. High table speeds infinitely variable and uniform from 2 to 100 ft. per minute are said to permit the use of hard, long lasting wheels. This speed range provides a grinding speed for practically any material.

Power is provided by a 30-h.p.

motor; however, a 40-h.p. motor is available if desired. Other features of the machine include positive lubrication to the table ways by a continuous automatic pressure system having visual glass "check points" in each line; general lubrication by a "one shot" lubricator conveniently located on the side of the column; and a power indicator mounted on the spindle giving a constant power reading that shows overloading of the motor.



Walker, pioneer in the chuck industry, has been utilizing magnetic force to make all types of special and standard chucks since 1887.

Walker now harnesses atmospheric force for special vacuum chucks to hold non-magnetic materials. Pioneer in magnetic force—now pioneer in atmospheric force.

O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks

Tool Bit Is Ground on All Four Sides

Armstrong Bros. Tool Co., 5228 W. Armstrong Ave., Chicago 30, Ill., has announced a



Armstrong High Speed and Cobalt Ground Tool Bits

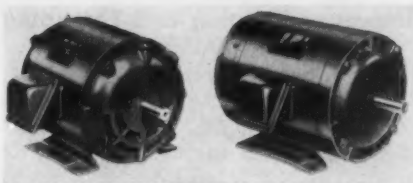
ground tool bit, available in high speed and cobalt types, which is ground accurately on all four sides with the ends beveled 10 degrees.

Each type of

tool bit is available in a full range of 12 sizes from $\frac{1}{16}$ to 1¼-in. square and is packaged for convenient handling. The tool bit is made of a fine grade of steel.

Re-Rated Polyphase A.C. Motors in the 1 to 30-H.P. Class

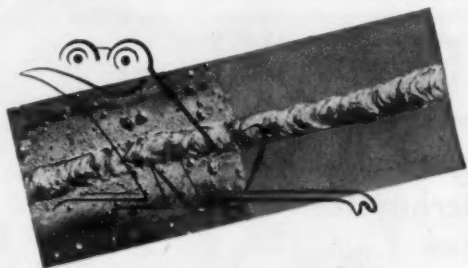
Howell Electric Motors Co., Howell, Mich., has announced a line of Series 100 re-rated polyphase a.c. motors in the 1 to 30-h.p. class. The motors are built to new frame-size to horsepower standards set by N.E.M.A. and are smaller and lighter than motors previously offered. In some models, the horsepower is actually double that formerly available in frames of the same size. Frames are made of rolled steel, and end plates are of cast iron, thus providing a rigid structure. Also, the use of rolled steel is said to afford more space for windings. Nearly 50



(Left) Howell Series 100 Open Drip-Proof Motor. (Right) Howell Series 100 Totally Enclosed Fan-Cooled Motor

per cent more contact area between cooling air and active materials assures maximum ventilation. Copper rotor construction has been retained.

The first motors offered in the Series 100 line are open, drip-proof motors and totally enclosed, fan cooled motors. Both types are available in 182 and 184 frame sizes, rated at 1, 1½ and 2 h.p. at 1,800 r.p.m.; 1½, 2 and 3 h.p. at 3,600 r.p.m.; and ¾, 1 and 1½ h.p. at 1,200 revolutions per minute.



WARTS ARE FOR TOADS, NOT WELDS

Spatter is usually a problem in arc welding . . . but these unsightly metal warts get the quick "brush off" with Protect-O-Metal No. 2. Simply brush or spray P.O.M. on weld area and adjacent surfaces. After welding, the troublesome weld spatter wipes off with a cloth or brush.

P.O.M. No. 2 causes no smoke, fumes or odors, is non-flammable and non-toxic. One coat serves for single or multi-pass welds, costs about 1/10¢ per foot, saves up to 85% of weld cleaning cost and labor. Order a trial gallon today. Satisfaction guaranteed.

PROTECT-O-METAL

P O M

G. W. SMITH & SONS, INC.,



5407 KEMP ROAD, DAYTON, O.

Improved Tapping and Threading Attachment Delivers Higher Speeds

Ettco Tool Co., Inc., 598 Johnson Ave., Brooklyn 37, N. Y., has announced several engineering improvements in its Ettco-Emrick Tapping and Threading Attachment, including a newly developed clutch, which permit the unit to deliver higher speeds and smoothly controlled clutch power necessary for efficient production, re-

gardless of the material. The aluminum clutch has been replaced by a completely redesigned steel clutch. The leather friction material has been replaced with a tough-fibered rubber-bonded synthetic material which is said to be impervious to heat, oil and wear.

The thick-walled heavy-ribbed die-cast case, of a modern design, contains from 4 to 6 oz. of No. 30 oil, sealed in at the factory prior to shipping. The steel clutch incorporates a built-in fan which whips the oil into a mist, drawing it

18% BIGGER BARREL

➤ ⚡ Gives Faster, Easier, More Accurate Measurements



There's more space between graduations making it easier to estimate fractions of thousandths. There are longer graduation lines and the rapid reading figures marking each thousandth are larger. Non-glare Chrome-Clad satin finish on the barrel gives you easy reading even in poor light. Lufkin micrometers are easiest to adjust, too — the reading line keeps its original position directly in line of vision and the thimble doesn't cover measurements on the hub.

New **LUFKIN** Big Barrel Micrometers

A Complete New Line To Exactly Fit Your Needs

In the new Lufkin Big Barrel Micrometers you have a choice of Friction Thimble, Ratchet Cap or Direct Feel only. You can have the exclusive new Lufkin Slip-Proof black crackle finish on the frame or Chrome-Clad satin finish. You can have any style with or without lock-nut. You can have carbide tipped anvil and spindle. The new Lufkin shorter design gives you better balance and the extended anvil and tapered frame permit you to take measurements in places inaccessible to other micrometers. You'll like the new Lufkin Big Barrel Micrometers — try the one of your choice today.

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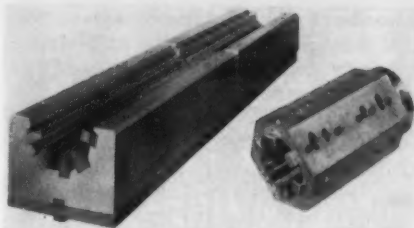
Ettco-Emrick
Improved Tapping
and Threading
Attachment

across the clutch faces. This combination is said to provide a long clutch life. A rigid chuck spindle, supported at both ends by Oilite bushings, is equipped with an Ettco-Emrick visible-grip tap-holding chuck.

Broach Finishes External Surfaces on Circular Metal Parts

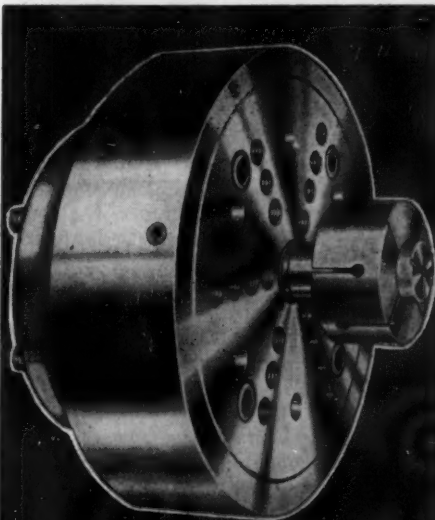
A broach which is designed for finishing external surfaces on circular metal parts, such as slots, flats, notches and contours usually produced by index or multiple milling operations, has been announced by National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. The broach is available in a wide variety of sizes in two general types; namely, an external surface broach type and an internal type. The surface broach type can be mounted on the ram of conventional single or dual ram surface broaching machines and broaches up to half the periphery of a part in a single pass of the broach. If broaching operations are required around the entire periphery, the part, which is mounted on a fixture on the broaching machine table, is indexed and completed by a second pass of the broach.

The internal type broach is mounted



Red Ring Surface Type Broach (left) and Red Ring Internal Type Broach (right)

on the table of conventional utility hydraulic presses and finishes the entire periphery of the part. In this arrangement, the part is mounted on a holder on the end of the press piston rod and pushed down through the broach. Two or more parts can be broached with each press stroke on a setup of this type by mounting more than one broach on the machine table and extra holders on a ram adapter. The size of circular parts that can be



9 Reasons for You to get the Facts on SPEEDGRIP CHUCKS

1. They increase production.
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Speedgrip Precision Internal Chucks will save you money on second operation work.

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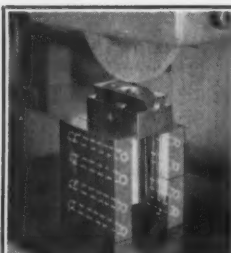
SPEEDGRIP CHUCK

820 N. WARD STREET
ELKHART, INDIANA

broached by either type broach is limited only by the tonnage and stroke capacity and fixture clearances of the broaching machine.

The external surface broach type consists of a steel main broach holder and steel sub-holders that support the high speed steel broach section inserts. When closely spaced narrow slots are broached in parts, the broach inserts are made in the form of blades that are bolted to the sides of the steel

sub-holder. The broach main holder is keyed to a sub base which in turn is keyed to the ram of the machine. The internal broach also has a steel broach holder into which steel subholders supporting high speed steel broach sections are bolted. The broach holder includes a pilot at the base for positive location on the broaching machine table in relation to the press piston rod.



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PER PAIR

- Silver Brazed
 - Reinforced With 2 Steel Rods
 - Precision Ground to .0001 Parallelism
 - Adjacent Sides Ground At Right Angles
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TEL. WHITMAN 462

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No. 41

**Magnetic
Chuck**

Parallels

7/8 x 2 x 4

Power Chuck Unit Is Designed for Small Lathes

The Skinner Chuck Co., 210 Edgewood Ave., New Britain, Conn., has introduced a power chuck unit, designated as the Skinner "Junior," which is said to enable small lathes to operate with economy and production speed. With a minimum of simple machining, the unit can be adapted to almost any small lathe with a 1 to 1½-in. hole through the spindle. The unit is light in weight and precisely balanced to minimize spindle bearing and braking loads. Work, it is claimed, can be chucked internally or externally with unusual repetitive accuracy.

The 8-in. self-centering chuck has a gripping capacity from ¼ to 6 in., and the jaw travel is ¼ inch. The complete power chuck unit includes the 8-in. three-jaw wedge-type self-centering air chuck; a 6-in. high-speed rotating aluminum air cylinder; an aluminum



Patented

Flash! APPRENTICE BOY DOES MOST DIFFICULT FORM DRESSING

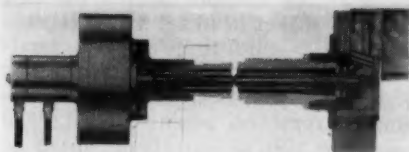
WITH AUTOMATIC ANGLE TANGENT TO RADIUS DRESSER.

By simply turning a handle, the most difficult profiles, either concave or convex, composed of angles absolutely tangent to a radius, can be dressed **AUTOMATICALLY**. Also, any combination of angles or arcs.

Write for Price and Folder.

Dealers' Inquiries Invited.

JEON MANUFACTURING COMPANY
Post Office Box 6750 Washington 20, D. C.



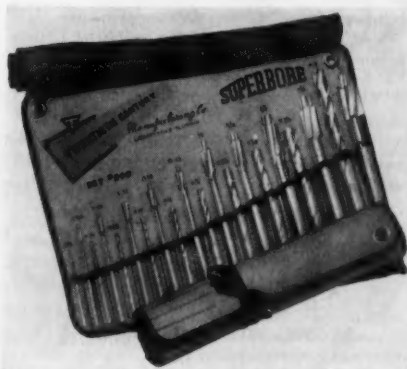
Cutaway view of Skinner "Junior" Power Chuck Unit

cylinder adaptor plate; a cylinder mounting tube; a tube lock nut; and a draw bar. The unit can be supplied complete, or parts and accessories can be furnished separately.

Counterbores in Decimal Sizes Available in Plastic Kit

Twentieth Century Mfg. Co., Route 176 and Bradley Rd., Box 429M, Libertyville, Ill., has announced that its "Superbore" counterbores in decimal sizes are now available in a plastic kit. The counterbores are made of an unusually tough, fine grade, high speed steel. Fore and aft precision grinding of flutes and pilots after heat treatment is said to allow chips to flow freely out of holes during counter-boring.

Twentieth Century "Superbore" Counterbores in plastic kit



FLYNN

**FOR 35 YEARS
THE LEADING NAME
IN BORING HEADS**



15 MODELS

Flynn has studied boring head applications for many years—builds a size and design for every job with all the wanted features. Machinists with real appreciation for quality and precision prefer Flynn.

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MANUFACTURING CO.

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Ferndale 20, Mich.

Write for our catalog



Unit Holds Hex Key in Socket Head Set Screws

A unique tooling accessory, designated as the Key Klip, which is said to solve the problem of keeping hex keys firmly attached to socket head set screws has been announced by Vlier Engineering, Inc., 4552 Beverly Blvd., Los Angeles 4, Calif. Developed primarily for use with the Vlier Screw-Ball Clamp, the device engages two or three threads on the screws and em-

ployes spring tension to hold the hex key and socket head set screw together. This is said to provide a semi-permanent handle to the screw for tightening purposes, yet can be instantly removed when desired. The accessory can be quickly mounted or removed for the hex key by compressing the open spring ends. Spring tension maintains the device on the hex wrench. The accessory cannot turn on the hex key because the mounting

holes provided are hexagon shaped ones.

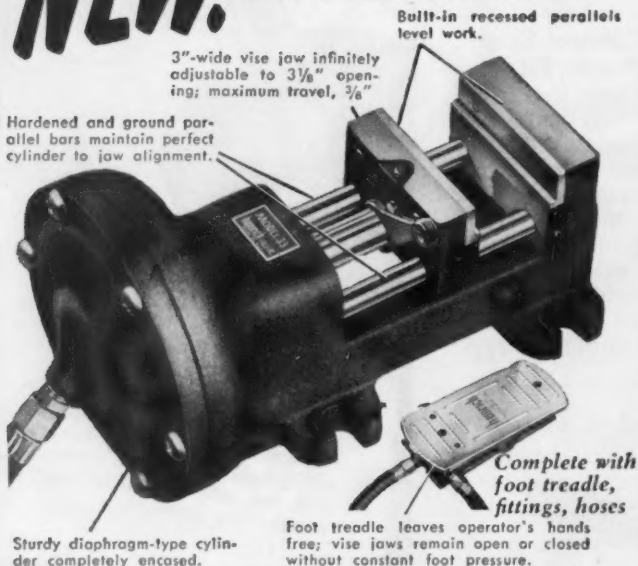
The design of the Key Klip is unusually compact, permitting



Vlier Key Klip mounted on hex key

full use of the key in tight quarters. It is made from clock-spring quality steel for maximum tensile strength and long fatigue life. The device is available in $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$ -in. sizes and may be used with virtually any type of socket head set screw.

NEW! heinrich Model "33" AIR VISE FOR HIGH-SPEED PRODUCTION



3"-wide vise jaw infinitely adjustable to $3\frac{1}{8}$ " opening; maximum travel, $\frac{3}{8}$ "

Built-in recessed parallels level work.

Hardened and ground parallel bars maintain perfect cylinder to jaw alignment.

Complete with foot treadle, fittings, hoses

Sturdy diaphragm-type cylinder completely encased.

Foot treadle leaves operator's hands free; vise jaws remain open or closed without constant foot pressure.

Precision-made Heinrich Model "33" Air Vise is easier to set with simple, ratchet-operated, triple-lead thread adjusting screw. Grips with 15 times air line or compressor pressure! All operating parts protected from oil, dirt, chips, etc. Saves tooling costs; use it as base structure.



NEW CATALOG FREE!

Be sure you have a complete Heinrich Tool Catalog in your files. Your copy will be sent free upon request.



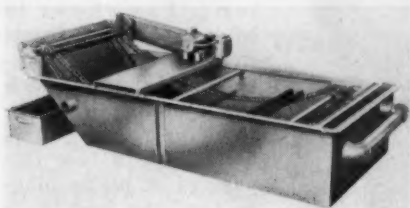
DEPT. 114-F

RACINE, WIS.

Drill Press Vises • Fixture Locks • Nibblers
Punches • Rod Cutters

Unit Is Designed for Filtering Relatively Small Solids

A settling and filtering unit, designed primarily for the filtration of rela-



Delpark Settling and Filtering Unit

tively small solids, which permits continuous removal of chips, heavy solids and relatively fine solids to 0.004-in. screening has been announced by Industrial Filtration Co., Dept. S-294, 13 Industrial Ave., Lebanon, Ind. The unit is made for the filtration of liquids

of varying degrees of viscosity containing solids of different particle sizes and widely differing weights. The size of the unit is dependent upon the settling rate which is governed by the gravity of the solids and the viscosity of the liquids which determine the retention period for a given rate of flow.

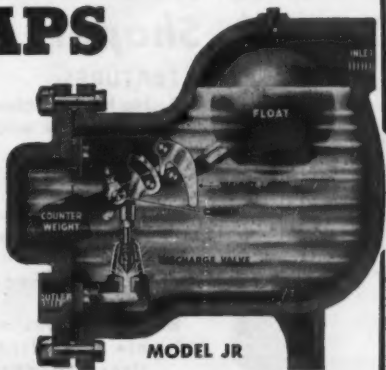
The system makes use of the well-known principle of expelling settled solids with chain driven flights. This principle is said to reduce the volume of solids to be removed by the filter screen. Filter screens are continuously cleaned by brushes which also serve as flights and aid in the removing and expelling of settled solids. Special bar-type screens with accurate slot sizes provide for filtering solids that remain in suspension as the liquid flows toward the outlet. Especially designed for easy cleaning while the machine is in operation, the bar-type screens are furnished in slot sizes as small as 0.004 inch.

Solve Sludge Problem With Nicholson's

New AIR TRAPS

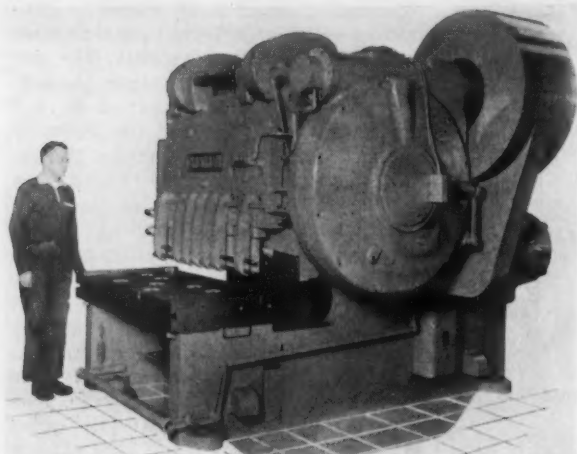
With the introduction of a new oil-eliminating feature, Nicholson air traps enable you to enjoy the advantages of the positive intermittent action of a float-operated air trap without the common problem of oil congealing on the mechanism and impeding or stopping its action. Three types; pressures to 1500 lbs. For details send for... Cat. 953

136 Oregon St., Wilkes-Barre, Pa.



W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS



Shear Cuts Mild Steel $1\frac{1}{2}$ Inches Thick By 4 Feet Long

The Cincinnati Shaper Co., Cincinnati 25, Ohio, has announced an all steel shear which is said to be capable

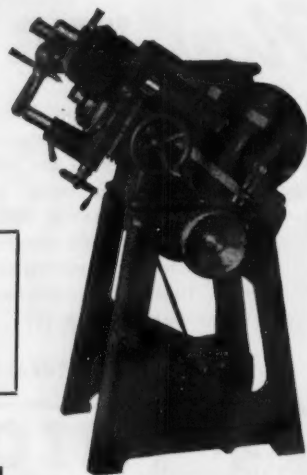
of cutting mild steel $1\frac{1}{2}$ in. thick x 4 ft. long. The shear is equipped with a front-controlled power-operated back gage which has a 48-in. range. The back gage angle is hinged to allow the passage of plates longer than the back gage range of the machine. The machine is made of all steel rolled plate and has an interlocked construction. It is powered by a silent worm gear drive and has a hardened multiple jaw clutch, hydraulic holddowns, light beam shearing gage, ball transfers in the table for easy feeding of heavy plate,

Punches Shaped from the SOLID with OTTMANN Punch Shaper



FEATURES:

1. No holder plates required.
2. Simple work mounting.
3. No re-setting — Work can be adjusted to any position of tool.
4. Forms shaped accurate. Parallel and true.
5. Minimum hand work.
6. Convenient, simple operation. Uses standard shaping tools.



CEDAR-WEST TOOL CO., INC.

90 WEST ST.

NEW YORK 6, N. Y.

Write for Literature

safety friction to the flywheel and slitting adjustments. Additional features include a special long scrap chute and air counterbalances.

Vitrified Grinding Wheel for Foundry Use

Norton Co., Worcester 6, Mass., has announced a vitrified grinding wheel, designated as "K" Bond, which is designed for foundry use at speeds up to 6,500 s.f.p.m. According to the manufacturer, the snagging wheel provides



Norton "K" Bond Grinding Wheel in use

for long life with fast, free cuts. "K" Bond was designed for "Crystolon" silicon carbide wheels in rough grinding cast iron. Important advantages claimed for the wheel are that minimum dressing is required to keep it sharp, the corners hold up for a long time without rounding and the wheels can be consistently duplicated from wheel to wheel and lot to lot. The wheel is available in all the sizes, shapes, grit sizes and grades (hardness) used on floor stand, bench stand, swing frame and portable grinders of the slow speed type for snagging gray and hard malleable iron castings.

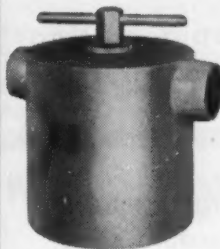
June, 1954



TWO Profitable Ways to use FRANTZ



Magnetic Separators



Models PQ-4 and larger

—1—

Keep coolants free from chips and other small ferrous particles such as rust and scale on critical operations like tapping and threading, deep drilling and reaming, trepanning and gear cutting. Removal of magnetic particles contribute to longer tool life, more production between grinds and finer finishes.



Models PQ-3 and smaller

—2—

Keep lubricating oil and hydraulic fluids free from minute particles of metal worn off working parts as well as scale and rust. You'll reduce damage to pumps, bearings and gears; cut down maintenance and costly repairs.

Send for BULLETIN PM-79

S. G. FRANTZ CO., Inc.

P. O. Box 1138

Trenton 6, N. J.

MODERN MACHINE SHOP 337

GAMMONS

TAPER REAMERS for all types of die work

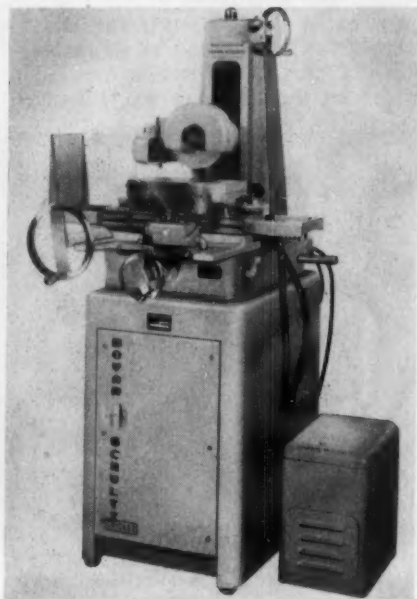


- Specially treated for modern die steels.
- Rapid cutting capacity.
- Large range of standard sizes.
- Tapers per inch: .005, .008, .013.

GAMMONS • HOAGLUND CO.
MANCHESTER 2, CONN.
Manufacturers of helical taper pin, chucking,
die makers and special reamers.

Surface Grinder Features Hydraulic Longitudinal Action

Boyar-Schultz Corp., 2120 Walnut St., Chicago 12, Ill., has announced that its 6 x 12-in. surface grinder is now available with hydraulic longitudinal action. A hydraulic valve, designed and developed by Boyar-Schultz, is said to afford perfect recip-



Boyar-Schultz 6 x 12-Inch Surface Grinder with hydraulic longitudinal action

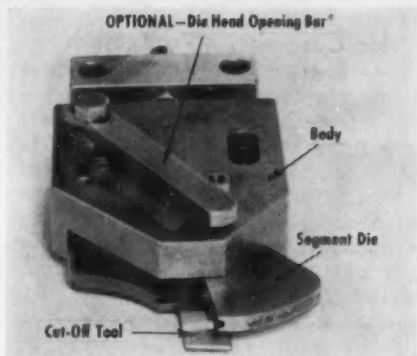
rocating movement. The machine can be changed from hydraulic to hand feed and return in a few seconds.

Screw Machine Tool Performs Marking and Cutting Off Operations

A dual-operation screw machine tool, designated as the Model 700, which is designed to perform marking and cutting off on automatics has been announced by New Method Steel

Stamps, Inc., 147 Joseph Campau, Detroit 7, Mich. According to the manufacturer, the marker can be used in conjunction with almost any suitable screw machine tool for cutting off. The die used for marking is a segment and is carried clear of the part after marking while the cut-off tool continues its operation to completion. Marking can be performed at any point in the automatic screw machine cycle as long as the marking surface is at its final diameter.

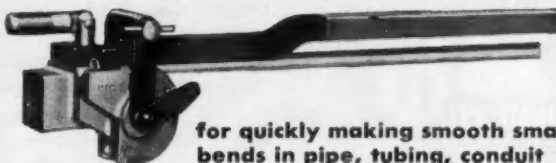
Depth of marking impression is controlled by means of a starting cam on the segment die. The cam extends some distance ahead of the first character, permitting variation of marking depth by adjusting the point of contact of the part with the starting pad. The marker is available for use in practically all conventional automatic screw machine tools and can be supplied with the proper additional tooling for maximum productive effici-



New Method Model 700 Automatic Marker Screw Machine Tool with cut-off tool

ency. The segment dies permit a quick changeover when a change is required in the marking data. The marking operation is completed in one revolution of the spindle, and uniform depth of the impression is said to be maintained.

GREENLEE HAND BENDER



for quickly making smooth small-radius bends in pipe, tubing, conduit

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit



GET FREE FOLDER E-207 AND BOOKLET E-201. Complete facts and prices on the Greenlee Bender line. Write Greenlee Tool Company, 1980 Herbert Avenue, Rockford, Illinois.

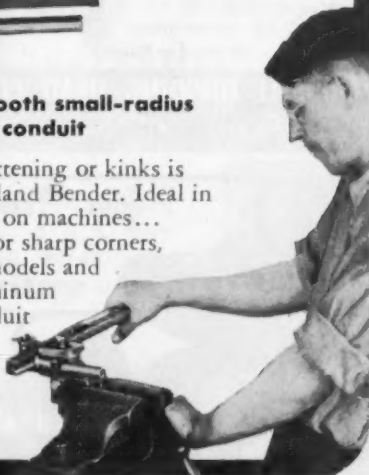


Plate Bending Rolls Are Built for Continuous Production

Pope Machine Co., Inc., 5201 S. First St., Seattle, Wash., has announced a complete line of plate bending rolls for every purpose. Built for continuous production, the rolls are of all steel construction and include both the pyramid and initial pinch types used in industrial plants of all kinds for rolling steel, aluminum and other non-ferrous plate. The No. 3 initial pinch

type roll, for example, is said to make possible rolling speeds up to 30 ft. per minute. Features include solenoid



6" Universal Dividing Head

with DIRECT INDEXING

Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

Write for Folder

CARROLL DIVIDING HEAD CO.
3525 Cardiff Ave. • Cincinnati, Ohio



Pope Plate Roll in use

brake, heavy structural frame with cast steel housings and all cut steel gears in the drive. There is special provision for rolling small diameters.

Improved Bench Center Features Streamlined Bed

Brown & Sharpe Mfg. Co., Providence 1, R. I., has announced changes in design and improvements in its bench center. The bed of the improved center has been streamlined and modernized. The bed is of U cross sec-



You Need an Extra Hand Now to Speed Up Production!

HEIMANN TRANSFER SCREW SETS

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money too!

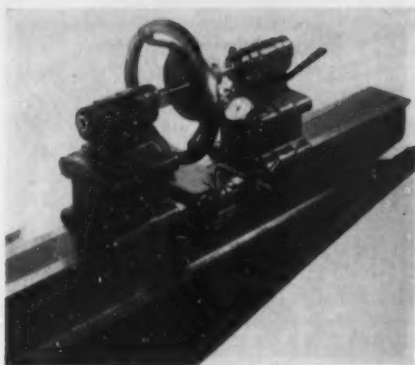
IN 11 SIZES—No. 6 to 1" N.C. in all S.A.E. sizes.

HEIMANN MFG. CO. • URBANA, OHIO

tion, heavily ribbed with a three-point bearing. The headstock and footstock are adjustable individually and can be locked securely at any position on the bed.

For supporting heavy work, the spring-actuated center may be locked in position. The bench center is furnished with or without a dial test indicator. The dial gage regularly supplied reads by half-thousandths; however, a dial gage reading to ten-thousandths can be furnished.

The headstock and footstock centers can accommodate workpieces measuring 8 in. in diameter x 36 in. in length; however, 4 in. raising blocks can also be supplied to increase the capacity of the bench center to work up to 16 in. in diameter. The bench center is said to provide a simple, accurate means for holding cylindrical work for inspection purposes. Work mounted on an arbor can be checked axially for



Brown & Sharpe Improved Bench Center

side runout or camming action. Where tests are required to unusually close limits, the center may be lapped to the work and an electronic testing device easily applied for measuring in very fine increments.



Hartford

PRECISION BALLS

to your specifications

Chrome alloy balls for every requirement. Also stainless steel, bronze, Monel, K. Monel, aluminum, copper, glass, plastic, and drilled balls. Also special bearings and retainers. Just send your specifications to our Engineering Department.

THE HARTFORD STEEL BALL CO.
Hartford 6, Connecticut

DETROIT-2
W. S. TURNER
445 NEW CENTER BLDG

CHICAGO 6
VICTOR H. CLARK
805 W. WASHINGTON BLVD

NEWARK 2
GUARANTEE TRUST BLDG
972 BROAD ST

LOS ANGELES 15
E. D. MAURY CO
1778 SOUTH FLORIN ST

EXPORT
R. A. RODRIGUEZ, INC.
35 W. 42ND ST. NEW YORK 18

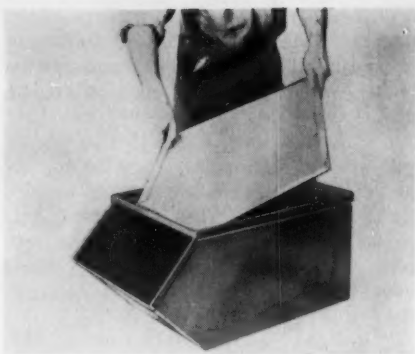
SH554

June, 1954

MODERN MACHINE SHOP 341

Divider Doubles Variety of Parts Stored in Same Bin

Stackbin Corp., 1083 Main St., Pawtucket, R. I., has announced a divider which provides up to double the number of openings for all standard sizes of Stackbins. According to the manufacturer, the removable divider furnishes an excellent solution for installations where extra flexibility is desired, in both the size and number of openings. Stackbins with perma-



Stackbin with removable divider

nent dividers are also available. Stackbins with dividers can be furnished in any standard size or in special sizes on request.

"SEALFLEX" TUBING



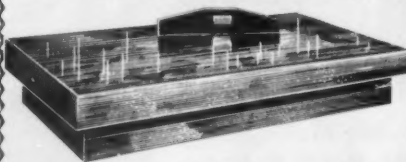
**Leakproof—
Stays in place**
For Coolants, Cutting
Oils, Solvents

Made of steel with brass fittings—males, nozzles, stopcocks, etc., made in 1/8", 1/4", 3/8", 1/2", 3/4" I.D. Write for bulletin and prices.

VERMONT FLEXIBLE TUBING CO.
Lyndonville, Vermont

MICROFLAT BLACK GRANITE SURFACE PLATES

and Granite Precision Straight Edges



All sizes. Request bulletin and location of nearest distributor.

- COST LESS THAN METAL PLATES
- Non-magnetic
- Non-corrosive
- Perfect precision
- Temperature-inert

COLLINS MICROFLAT CO.

2326 E. 8th St., Los Angeles 21, Calif.

Permanent Magnet Separator Removes Fine Steel Particles from Hydraulic Fins

Designated as the Model PX-2, a lightweight magnet separator for hydraulic fluid systems that provides for the removal of very fine steel particles which may wear off moving parts has been announced by S. C. Frantz Co., Inc., P.O. Box 1138, Trenton 6, N. J. The unit was designed specifically for use in aircraft hydraulic circuits; however, it may be installed wherever working pressures do not exceed 3,000

Portable Sandblast Gun

Rugged

•

Efficient

•

Guaranteed

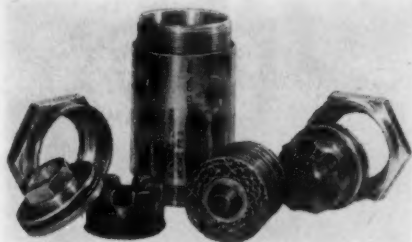
\$27.50

LINDBERG PRODUCTS CO.,

**—Complete—
simply connect
to air line**

**A Real Performer
handy in any shop**

**Box 885 M
Los Gatos, Calif.**



Disassembled view of Frantz Model PX-2 Lightweight Permanent Magnet Separator

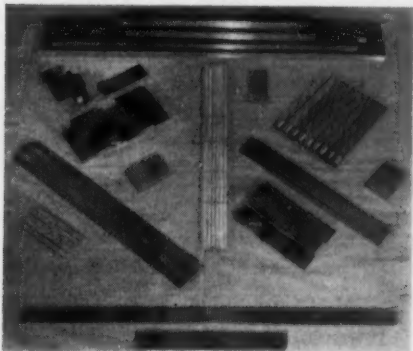
p.s.i. The fluid enters from either end of the unit and is filtered through a stack of soft steel grids which are strongly magnetized by Alnico permanent magnets.

The separator is 5 3/8 in. long and 2 7/8 in. in diameter. Made for a 1/2-in. tube connection, the unit has a maximum capacity of 10 g.p.m. Hydraulic O-ring gaskets provide a positive seal at both ends. The separator weighs 3 lb. dry.

Gear Racks

Braun Gear Co., Dept. R., 236 Richmond St., Brooklyn 8, N. Y., has included in its manufacturing facilities rack generating equipment. Through the use of this modern equipment,

Illustration showing typical Braun Gear Racks produced to user requirements



PRODUCTION BORING

with

E-Z SET

by
Maxwell



Only the MAXWELL E-Z Set boring tools feature high speed operation, micrometer-like adjustment to 0.0001-inch and maximum boring range.

Interchangeable shanks permit E-Z Set boring tools to be used in turret lathe, jig-bore, milling machine, boring mill, automatic or other machine tools. Because they can be adjusted for cut in only one-tenth the time formerly required by similar tools, these Maxwell-made tools can meet high-speed production on schedules.

E-Z Set boring tools are available in three models having maximum boring bar capacities of 1/2, 1 and 1 1/2 inches and covering a boring range of from 3/8 to 20 inches.

Write today for catalog.

395-MC



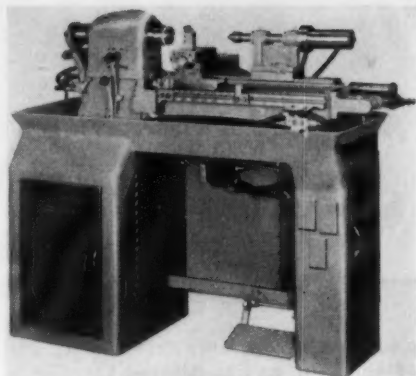
THE MAXWELL COMPANY

325 Broadway • Bedford, Ohio

racks of almost any size, shape and material can be made to meet user requirements. These racks are produced by the generating principle with either straight or spiral teeth.

Lathe Provides Desk High Bed and Spindle

A highly versatile production lathe, designated as the Desk Model, which provides a desk high bed and spindle

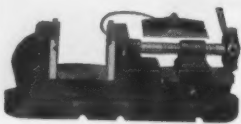


Elgin Desk Model Lathe

GEM MACHINE VISES DO A BETTER JOB!

IN LESS TIME!

**WITH SAFETY
AT LESS COST**



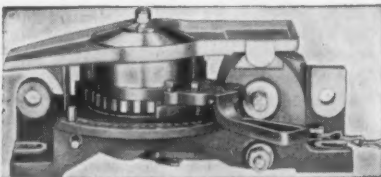
Complete range of sizes. Plain, Swivel and Tilt-ing. For Drills, Mills, Planers, Grinders, etc.

J. E. MARTIN MACHINE CO.

SPRINGFIELD

OHIO

MODEL H AUTOMATIC Chucking & Indexing Fixture



1. 1800 light cuts per hour.
 2. Either horizontal or vertical position.
 3. Collets changed instantly.
 4. Automatically knocks piece out.
 5. Ratchet or degree indexing — degree indexing added later if desired. Capacity 1".
 6. Automatic indexer also added later.
- Model F—Both degree and ratchet indexing. Capacity up to 2 3/4".

Write for Folders

J. W. DEARBORN • Ansonia, Conn.

for the convenience of women operators, plus an operating lever and pedals placed for fast and easy action, has been announced by Elgin Tool Works, Inc., Dept. II, 1771 Berteau Ave., Chicago 13, Ill. The lathe, it is claimed, provides for instant spindle run-stop and collet position control, thereby making it an ideal machine for short turning, facing, crimping and many other operations. The machine is available in two models; namely, the 4 P 7 with a 3/4-in. draw-in type collet and the 1 1/2-in. model with a stationary type collet. The lathe has a 7-in. swing with 15 in. between centers and provides for speeds up to 4,000 r.p.m. The machine can be equipped with compound slide rest, double cross slide, and six-hole turret.

AUTOMATIC DRIVING CENTER



- Movable driving bolts counteract irregularities in uneven end faces of components. Parts can be inserted, removed and re-chucked with machine running. No driving dog face plate.

Write for folder.

MERA MACHINE & MFG. COMPANY
221 SPRING ST. ELIZABETH, N. J.

Mobile Tool Stand Is Useful for Assembly, Inspection and Maintenance

Designated as the Model 426, a mobile tool stand which is said to be particularly useful for assembly, inspection and maintenance in industry and routine work in garages and service stations has been added to the Hallowell Carry-Tool line by Standard Pressed Steel Co., Jenkintown 22, Pa. The stand, made of heavy gauge steel and mounted on 2½-in. swivel casters,



• Hallowell Model 426 Carry-Tool Stand

has a cabinet and two drawers. The top is a recessed tray. The unit has overall dimensions of 18 x 24 x 35½ in. high. The cabinet on the stand is 14 in. high and has a door with a chrome locking handle. Each drawer is 5 in. high and has roller suspension and an individual padlock attachment. The stand is supplied in baked-on standard green enamel.

Stacking Boxes Nest One within the Other When Not in Use

Palmer-Shile Co., 16022 Fullerton Ave., Detroit 27, Mich., has announced

NOTE THIS AMAZING
**INCREASE In
PRODUCTION**

When Using the
**"M-B" JUNIOR
PNEUMATIC
GRINDER**



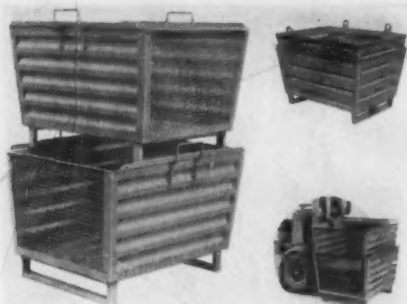
"In one of the applications, where M-B Grinders are employed, (using a ¾" dia. Tungsten Carbide Burr with ¼" shank) the following improvement in production took place. Previous to the application of our Junior Pneumatic Grinder, it took 7 girls 8 hours to turn out 200 pieces. Now 1 girl is turning out 1600 pieces in an 8-hour period."

The above record was made in a plant of one of our country's largest manufacturers. Although there had been a general overhauling of their procedure, the greatest part of this improvement was credited to the use of M-B Junior Grinders. Your production can likewise benefit by the use of these modern M-B devices.

Also Automatic Air Line Filters,
Regulators and Lubricators

Write for Literature

M-B PRODUCTS
46 Victor Ave.
DETROIT 3, MICHIGAN



Palmer-Shile Nesting Stacking Boxes

a line of stacking boxes which are designed to nest one within the other when not in use, thus conserving floor space. There is a 6-in. nesting clearance between the box tops. Loaded boxes may be stacked by crane or fork truck by simply lifting, turning and tiering on the lower box. Made either with two corrugated sides and ends or

both ends of expanded metal, each box has a capacity of 4,000 lb. and weighs approximately 190 lb. The inside dimensions are 45 in. long x 36 in. wide x 23 in. deep. The boxes are of all-welded construction.

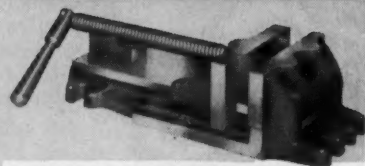
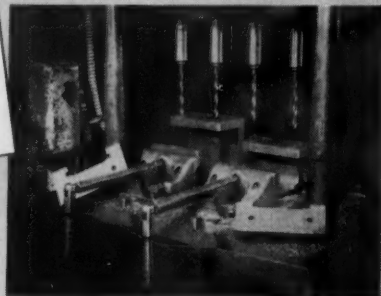
Power Press Brake Has Completely Controlled Recorded Pressure

Dayton Rogers Mfg. Co., Minneapolis 7, Minn., has announced a stub-type power press brake, which was developed primarily for V-forming, U-forming, general forming and other such requirements necessitating controlled pressure at the point of operation, having completely controlled recorded pressure throughout the work cycle. The work cycle is divided into a low pressure advance to the work and high pressure for the forming or shap-

Here's PROOF that
~~SPEED VISE~~
is a fast production tool

Here's a production set-up on a multiple spindle semi-automatic drilling machine that is really cutting manufacturing time and costs. The use of two Speed Vises eliminates the need for expensive and complicated fixtures and at the same time increases the production range. With Speed Vise it is only necessary to make a simple jaw plate to fit the parts being machined and to hold drill bushings, etc.

- ★ Quick action design for speed. Opens instantly to full capacity to handle work of any size.
- ★ Standardized holes for attaching jigs or jaw plates.
- ★ Lift... slide... lock... that's all there is to the fast, positive locking action.
- ★ Heavy, semi-steel castings for extra strength and a heavy base plate for rigidity.

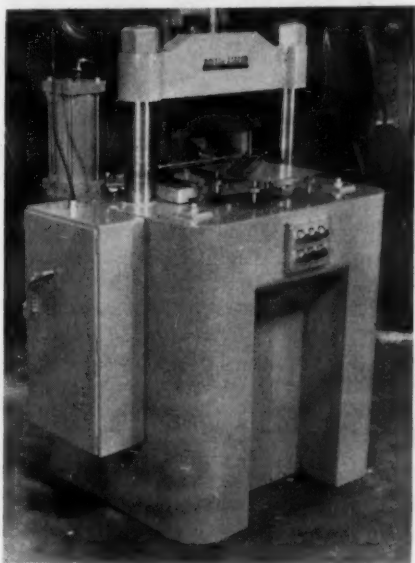


Write now for Bulletin 30-MM

CARDINAL MACHINE CO.

1819 Dana Street, Glendale, California

ing period of the work cycle. The timing of the cut-in and the time period for each phase can be easily varied. Fully automatic cycling, consisting of low pressure advance and high pressure forming, and controlled retreat is said to be possible. The length of stroke can be varied from 2 to 11 in., excluding die height. The entire unit operates off the shop air line and has a capacity of 42 tons at 100 pounds per square inch.



Dayton Rogers Stub-Type Power Press Brake

Basically, the machine operates on a hydro-pneumatic booster principle. The shop air line acts on the large area of a stepped diameter piston to boost the pressure of the hydraulic fluid on the small area side. This high pressure oil is channeled to another hydraulic cylinder which does the work during the press work cycle. According to the manufacturer, the machine is adaptable to practically any type of power brake press die in short lengths up to and including 24 inches.

June, 1954

NUMBERALL

QUITS THE COST OF STAMPING NUMBERS

SELECTIVE NUMBERING HEADS

Press
Style
Model
83

All wheels
• QUICK SET



Model 83 Heads for all stamping operations requiring quick selective numbering. Wheels engraved with direct sight figures at front of machine. Set to the required character by turning the knobs. By pushing the knobs right or left anyone of the wheels may be engaged. Indexed wheel selector knob serves as a positive stop for every wheel. 1/16" to 1/4" size figures. Letter wheels, with up to 11 letters and a blank on each wheel can also be supplied. Heads are more efficient and durable than old style lever machines. Furnished in sizes from 1 to 15 wheels. Bulletin MS83.

IMPROVED TYPE HOLDERS

Hand or Press style. Type can be easily, quickly loaded and unloaded. Simplest construction... Just a sturdy pin holds the type securely. No screws nor springs. Super-quality steel type made in various sizes: 1/32" up to 1/2" figures and letters.



Write for Bulletin MS23H

Steel Type

NUMBERALL STAMP & TOOL CO.

HUGUENOT PARK STATEN ISLAND 12, N. Y.

Drill Has High Speed Steel Body and Heavy-Duty Carbide-Tipped Point

Designated as Type No. 1750 Hard-duty, a drill with a high speed steel body and a heavy-duty carbide-tipped point that is designed to drill accurate holes in hardened die steel heat treated to from 40 to 65 Rockwell C has been announced by Chicago-Latrobe Twist Drill Works, 419 W. On-

tario St., Chicago 10, Ill. According to the manufacturer, the drill is capable of producing holes in hardened steel



Chicago-Latrobe Type No. 1750 Hard-duty Drill Set

with good surface finish and without annealing the walls or surrounding surface of the hole. The drill is available in sizes ranging from $\frac{1}{8}$ through $\frac{3}{4}$ in., in increments of $\frac{1}{32}$ in. diameter. Drill sets, packaged in attractive durable wooden boxes, containing sizes $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ inch are also available.

MICRO-HEIGHT GAUGE

BY FAIRFIELD GAUGE CO.



NO OTHER GAUGE COMPARES FOR FAST, ACCURATE LAYOUT AND MEASURING

Capacities to 6" when used with this Fairfield Gauge 3" Riser

The Micro-Height Gauge is a precision instrument, finished in satin chrome, which reads like a micrometer and measures from zero at base to 3" in thousandths. Use as a scribe for fast layout, or insert dial indicator for quick, accurate inspection.

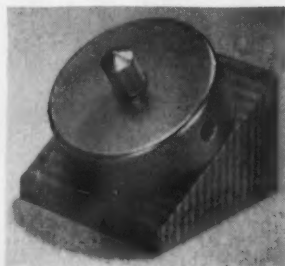
Exclusive distributor for U.S. and Canada:

CLEVELAND INSTRUMENT CO.

735 Carnegie Ave., Cleveland, O.

Device Protects Hydraulic Feed Settings

A protective device for hydraulic flow control valves has been introduced.



ANTON

- MAGNETIC V-BLOCKS
- MAGNETIC PARALLELS
- MAGNETIC DIAMOND HOLDERS
- MAGNETIC ADJUSTABLE V-BLOCKS
- MAGNETIC MILLED BLANKS

Anton's Magnetic Diamond Holder offers a quick and easy way of self-sharpening the diamond point through its unique feature of rotation by handling.

Pat. Pending

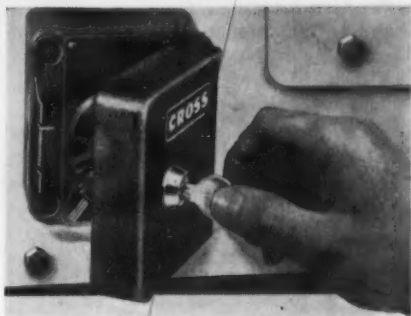
ANTON MACHINE WORKS

1226 FLUSHING AVE.

BROOKLYN 37, N. Y.

ed by The Cross Co., Dept. 20P, Detroit 7, Mich. Identified as the Cross Flow Control Lock, the unit is designed to prevent unauthorized personnel from tampering with the hydraulic feed setting on production machine tools, thus assuring the maintenance of constant correct feed rates, stopping unnecessary shutdowns, saving tool sharpening, reducing tool breakage and protecting the machine from avoidable abuse. The lock consists of a mounting plate, sidewalls and a hinged locking cover. After the desired feed has been set, the cover is closed and locked with a key-operated barrel-type lock. This, of course, prevents any tampering after the feed has been set, since only authorized personnel, such as job setters and supervisors, carry a key for the lock.

The device can be quickly and easily installed. The valve nameplate and adjusting lever are removed. The mounting plate is inserted under these



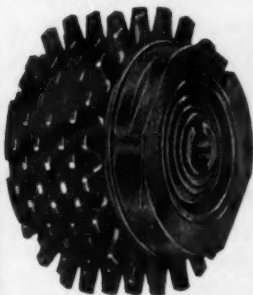
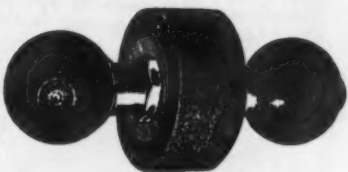
Cross Flow Control Lock

parts, after which they are screwed back in place. The lock is compact, taking up the same area as the face of the valve body and projecting only enough to allow clearance over the feed setting lever. Models are available for Vicker's 1/4-in. flow control valves and remote control panels.

HANCHETT METCALF WHEEL DRESSERS

FAST CUTTING ACTION

Balanced . . . Free Running . . . High Speed
Crushing and Wheel Forming Action . . .
For SHARP, CLEAN, OPEN WHEEL FACES



MODEL 1943 CC ASSEMBLY

STEEL CUTTERS
For Surface
Grinders, etc.

Complete
Assembly \$ 7.50
Extra Wheel \$1.35

Made by the World's Largest Manufacturers of

**SAW SHARPENING and
KNIFE GRINDING MACHINERY**

HANCHETT MANUFACTURING CO.

BIG RAPIDS, MICH.

MM-112

PORTLAND 1, ORE.

SHARP

NAMEPLATE MARKING

Model No. 4



The nameplate on your product is your signature. Keep it neat and legible. Accurate location and alignment are assured with this

NAMEPLATE DETAIL PRESS.

- Simple Operation
- Perfect Alignment
- Uniform Depth

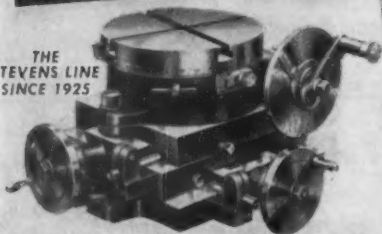
GEO. T. SCHMIDT, INC.



1806 W. BELLE PLAINE AVE.
CHICAGO • 13 • ILLINOIS

COMBINED TRANSVERSE AND CIRCULAR MOVEMENTS ON STEVENS #1 COMPOUND TABLE

THE STEVENS LINE SINCE 1925



Combines $3\frac{3}{4}$ " longitudinal and $3\frac{3}{4}$ " transverse movements with circular movement of $7\frac{1}{2}$ " Rotary Table. • Rotary Table and Compound Table can be used separately. • Larger No. 2 Compound Table also available.

WRITE FOR BULLETIN

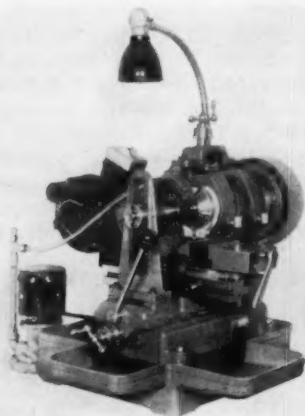
Rotary Tables • Multiple Spindle Index Centers • Vises • Screw Head Slotters

The John B. Stevens Company

Main Street, Somersville, Conn., U. S. A.

Special Accessories Are Available for Barker Bench-Type Mill

The Barker Engineering Co., 500 Green Rd., Cleveland 21, Ohio, has announced an expansion in their line of special accessories which are said to make the Barker Bench-Type Mill a more versatile machine and capable of an increased range of milling and machining operations. The accompanying illustration shows a completely equipped machine, including a low spindle drive developed especially for milling steel; the arbor support which makes



Barker Bench-Type Mill completely equipped with special accessories

possible heavy milling cuts without chatter; the coolant pan with motor-driven pump; cutter guard and spindle nose coolant shield; and the standard swivel base vise.

The bench-type milling machine is also equipped with micrometer feed screws on the head and saddle travel positions; however, it is possible to have hand lever operation or micrometer feed screw operation to control travel of all three positions. Different combinations of these feed controls can be selected to best suit individual requirements.

Cemented Carbide Blanks for Light Roughing of Steel

Designated as Grade 350, a cemented carbide which is available in



Illustration showing Carboloy Grade 350 Cemented Carbide Tool in use

standard tools and blanks for light roughing and general finishing of steel has been announced by Carboloy Department of General Electric Co., 11143 E. 8 Mile St., Detroit 32, Mich. The blanks are available in numerous

sizes and in three styles of rectangular blanks. All standard square, triangular and round, mechanically-held inserts, finish ground and ready for use, are also available in this grade. A wide selection of both right and left-hand standard tools can be supplied.

Milling Cutter and Toolholder Utilize Non-Rigid Cutting Elements

A milling cutter and a toolholder, utilizing the "Mech-Grip" principle, which feature cutting elements that are non-rigid, cushioned against shock in the cutting area of the tool, have been announced by J & S Tool Co., Inc., 645 W. Mt. Pleasant Ave., Livingston, N. J. In the two cutting devices, the cutting edge overhangs the shank support edge by about 30 per

NEW

ACCURATE

AUTOMATIC

Morrison

1" KEYSEATER

- ★ AUTOMATIC FEED eliminates pushing a feed bar and insures accuracy.
- ★ AUTOMATIC STOP cuts off the feed for any given depth.
- ★ AUTOMATIC RELIEF backs the work away from the cutter eliminating drag and insuring a clean keyseat.
- ★ AUTOMATIC CENTERING centers up the work quickly and easily.
- ★ AUTOMATIC LUBRICATION feeds oil to all necessary moving parts.
- ★ SINGLE TOOTH CUTTERS for accurate clean keyseats and eliminating time and trouble in sharpening.
- ★ QUICK SET UP is one of the most important features.

Write for descriptive circular.



The D. C. MORRISON Company

P. O. BOX 1017-B • CINCINNATI 1, OHIO

cent or more the width of the tip (dimension in line with direction of feed). The cutting tip is mounted on a supporting plate about the same size as the tip. The clamp which holds the cutting tip securely in place is canted in relation to the tip surface; the tip touches the clamp only at its front edge. This unique design is said to enable the cutting edge to give or "roll

with the punch" when the entering shock is met. The cushioning effect of the tools is said to reduce minute chipping of the edge.

Tips in the milling cutter can be indexed quickly. A half turn of the clamping bolt permits the tip to be indexed to the next cutting edge in about 10 seconds. In such a case, the cutter body remains undisturbed. Tips

in the milling cutter are held at a 7-degree negative axial and radial angle. All tips are ground square

POLISH • GRIND • BURR • SHARPEN IN SECONDS ... WITHOUT TEARING DOWN SET-UPS

**Do It Faster With A
DREMEL MOTO-TOOL**

Dremel Moto-Tools are used in many different types of industries by thousands of diemakers, machinists and hobby craftsmen for polishing and grinding dies, burring parts, sharpening cutters, etc. A money-maker and time-saver, the Moto-Tool does close work in seconds without tearing down costly production set-ups.

**APPROXIMATELY
27,000 R.P.M.**

MOTO-TOOL NO. 2, with one emery wheel point..... **\$17.85**
MOTO-TOOL KIT NO. 2, with 23 accessories (high speed steel cutters) and Model 2 Moto-Tool in sturdy steel case..... **\$25.95**



GRINDING



SHARPENING



BURRING



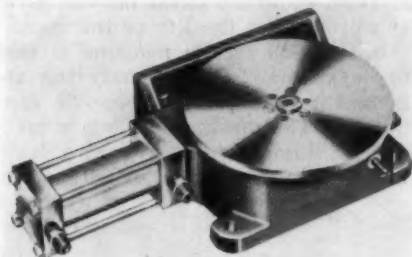
(Top) J&S "Mech-Grip" Milling Cutter.
(Bottom) J&S "Mech-Grip" Toolholder

within plus or minus 0.0003 in. and can be indexed eight times before it becomes necessary to re-grind them.

See Your Nearby Industrial
Distributor or write for catalog.
DREMEL MFG. CO., Dept. 224-F, Racine, Wis.

Indexing Dial Feed Table Operates in Limited Space

Designated as the Model 725-F, an indexing dial feed table which is de-



Allenair Model 725-F Indexing Dial Feed Table

signed for use in area where space is limited has been announced by The A. K. Allen Co., 57 Meserole Ave., Brooklyn 22, N. Y. The table utilizes a 7¼-in. diameter top plate and can be mounted either horizontally or ver-

tically. An important feature of the table is the availability of compressed air at the top center of the table, permitting air clamps, air collets or air chucks to be operated from an outside source as the table is being revolved.

The table is available in two models; namely, the Model 725-FA which is furnished without control valves and the Model 725-FB which comes completely equipped for fully automatic operation. Each model is available in the standard 4, 6, 8, 12 and 24 set of indexing positions. Accuracy of indexing is said to be within a plus or minus 0.002 in. at the periphery of the top plate.

Marking Machine Features Pneumatic-Hydraulic Table Lift

Designated as the 240 "Air-draulic," a machine which rolls permanent impressions, from a single character or

**Take the
GLARE out of
Micrometer
Reading**

with the *"Lustro-Chrome"*
MICROMETER

**MEASURE TO
1/10,000 th**

ALL GRADUATIONS ARE WELL-DEFINED BLACK LINES ON DULL CHROME SURFACE WHICH MEANS EASIER AND Surer READING, EVEN IN POOR LIGHT.

GUARANTEED ACCURATE WITHIN ONE HALF OF A TEN THOUSANDTH OF AN INCH.

THE CHROME SURFACE IS EXTREMELY HARD AND NON-PEELING. IT PROTECTS THE TOOL INDEFINITELY FROM RUST AND DISCOLORATION.

DROP-FORGED MODEL WITH CHROME MICROMETER HEAD, 10th VERNIER, FROM \$9.25 UP.



No. 901 C
0-1" size
with LOCK NUT
and RATCHET and
10th vernier as shown

\$13²⁵

This tool with
TUNGSTEN CARBIDE
tipped anvils **\$15.75**

**Dealers! Here's a
real profitable line**

Ask for Catalog on our Complete Line of Micrometers

GEO. SCHERR CO., INC.

200-MM LAFAYETTE STREET • NEW YORK 12, N. Y.

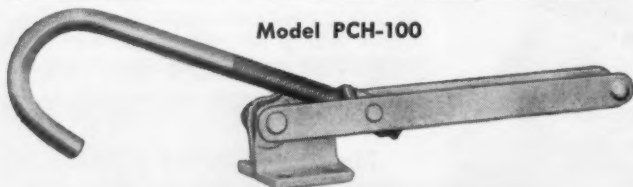
**COMPLETE LINE OF
PRECISION INSTRUMENTS**

trade mark to several lines of lettering 3½ in. long, on parts up to 6 in. in diameter has been announced by Jas. H. Matthews & Co., 3947 Forbes St., Pittsburgh 13, Pa. Furnished with special fixtures for holding different shaped parts, the machine features a combination pneumatic-hydraulic table lift which raises the unmarked part in contact with the face of the marking die. As the preset die-to-part pressure is exerted, a pneumatic sliding carriage rolls the die over the

marking area, producing a clean-cut impression. While the table provides easily controlled marking pressure, it also serves as a cushion to compensate for variations in the surface to be marked, reducing stress on the parts and prolonging the life of the die.

Installation of the machine is said to be simple, requiring only the attachment of a 70 to 100-lb. air supply line. The marking cycle is actuated by a single foot-control valve, leaving the hands free to handle parts.

The machine measures 52 in. high and occupies a floor space of 24 x 32 inches. The machine is



Model PCH-100

THIS NEW CLAMP

will simplify and speed your operations requiring pulling action.

This new clamp—a hook clamp—may have the answers to many of your problems—specifically where tension and sustained holding power is needed.

Save physical strength and time—simplify pulling jobs. Originally developed for aircraft industry, this unusual clamp can bring help to many other industries. Maybe yours!

Don't exert human strength; do the job mechanically. You can build up a great pulling force through the toggle action of this Knu-Vise clamp—quickly and easily.

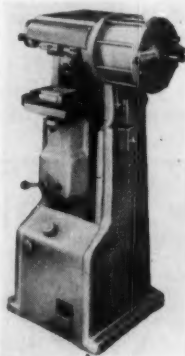
We'll tell you more without obligation. Send for complete information.

Sales offices in principal cities—Teletype DE 49

**KNU-VISE
PRODUCTS**

LAPEER MFG. CO.

3048 DAVISON ROAD • LAPEER, MICHIGAN
WESTERN DIVISION: 422 MAGNOLIA, GLENDALE, CALIF.
CANADIAN DIVISION: HIGGINSON ENGINEERING, HAMILTON, ONT.

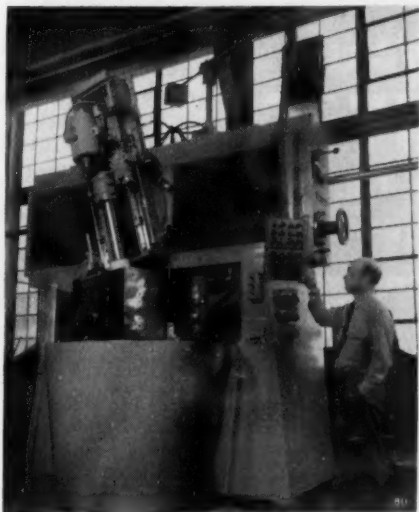


Matthews 240 "Air-draulic" Marking Machine

furnished with holding fixtures and die carriages designed to customer requirements and to accommodate flat roll, round roll dies or holders with interchangeable type segments for variable marking.

Grinder Is Designed for Finishing Large Parts

Finishing of such large parts as pipeline valve plugs and their mating seats is said to be quickly accomplished with a 42-in. vertical universal grinder, designated as the 3-TR, developed by The Springfield Machine Tool Co., Springfield, Ohio. The grinder has a normal maximum swing of 52 in., but can also be supplied with 16 and 25-in. swings. The machine is



Springfield Model 3-TR Vertical Universal Grinder

hydraulically operated and is said to require a minimum of attention from the operator after initial setup is made. All operating controls are located on a push-button pendant station. According to the manufacturer, the grinder is particularly useful on work requiring extreme accuracy and concentricity, as well as all types of vertical grinding operations. The head can be set at any angle up to 45 degrees, and with one angle setting, the machine can finish both male and

HOGGSON BRAND
Since 1849

STEEL STAMPS Letters & Figures

Letters and figures deep-cut in hardened, special formula steel assure clean impressions and long service. Faces are angled for added strength. Chamfered corners make it easy to locate the base. At your mill supply house or write for circulars.



CHAMFERED CORNERS
for locating the base



Monarch

STEEL MARKING DIES

For product trademarking or identification. Any style of lettering, designs, pictures, developed from your sketch or print. Straight or reverse. For hand or press. Whenever you get calls for marking dies, write us for prompt service.

HOGGSON & PETTIS MFG. CO.

New Haven 7, Conn.

female parts for precise, accurate fit.

Holes, either tapered or straight, can be ground to a depth of 2 feet. The standard machine is equipped with a single head, but modifications permit two or more heads. Work spindle speeds range up to either 88 or 176 r.p.m. in either direction, and the grinding head stroke is 27½ in. at speeds of up to 185 in. per minute. Maximum clearance over the 42-in. face plate is 25 in., and clearance over the work spindle is 30¼ inches. The

10-h.p. wheel spindle motor turns at 3,600 r.p.m., and the 7½-h.p. hydraulic system motor operates at 1,200 revolutions per minute.

Center Reamer or Countersink Furnished with 60, 82, 90, 100, 110 and 120-Deg. Included Angle

Whitman & Barnes, 40050 Plymouth Rd., Plymouth, Mich., has announced that its high speed center reamer or countersink with 90, 100, 110 and 120-degree included angle is now being furnished as standard. Previously, only 60 and 82 degree includ-

AMAZING
NEW
UTILITY

1954 FOSTORIA LOCALITES

for Machine Tools,
Assembly Inspection



MODEL 2-MP-700
Overall length 31"

\$7.32
Each

In std. pkg. of 8
Less \$9.15 ea.

Reflector—Semi-spherical shape with 6¼" orifice. Rotates 360°. Accommodates 100 watt A-21 or 60 or 40 watt A-19 lamp. Available with lens if desired.

Arm Joints—New patented tension disc. Easy, smooth action with only one hand. Available with 1, 2 or 3 arms.

Base—Universal for vertical or horizontal mounting. Also adaptable to outlet boxes. Collet revolves 360°.

Wiring—McGill industrial socket 4101-FL with Levolor switch. 8 ft. POT-32 18-2 heavily insulated oil resistant wiring with molded plug.

Finish—Gray baked enamel. Reflector interior, high temperature White.

Directs
Light
Exactly
as Needed

WRITE for complete catalog of
Localite models for every industrial use.

**THE FOSTORIA PRESSED
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Localites available through
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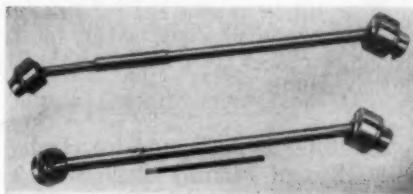


Whitman & Barnes
Center Reamer

ed angles were standard. Sizes include ¼-in. diameter to ¾-in. diameter inclusive in ⅛-in. increments. The 60 and 82-degree included angle countersinks in high speed and carbon steel are also available in sets.

Miniature Lightweight Universal Joint Is Compact and Rugged

A miniature, lightweight universal joint has been added to the line of



Rzeppa Miniature Lightweight Universal Joints

Rzeppa Constant Velocity Joints, according to the Joint Division, The Gear Grinding Machine Co., 3901 Christopher, Detroit, Mich. The universal joint embodies all of the unique Rzeppa features, including compactness, ruggedness, uniform flow of power, minimum weight and long life.

Explosion-Proof and Dust-Tight Motors

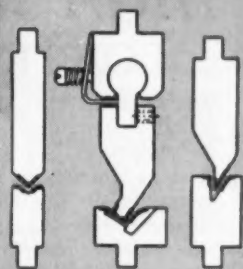
The Lima Electric Motor Co., 126 Findlay Rd., Lima, Ohio, has announced the Type EX explosion-proof motor and the Type ED dust-tight motor. The Type EX is designed for use in hazardous locations where gasoline, petroleum, naphtha, alcohols, acetone, lacquer solvent vapors and natural gas are present. This type is a totally-enclosed, fan-cooled, explosion-proof, UL-Approved motor for Class I Group D service. The Type ED is designed for use where hazardous grain dust, carbon black, coal or coke dusts exist. This type is totally-enclosed, fan-cooled, dust-tight and UL Approved for Class II Groups F and G service. Types EX and ED motors are built in ratings of from $\frac{1}{4}$ to 20 h.p. in N.E.M.A. frame sizes 224 to 326 inclusive, for operation on two or three phase, all commercial frequencies and voltages below 600.



INDUCTION HARDENED PRESS BRAKE DIES

for greater die life at no extra cost
on any make of press brake

Whether it is a simple die for angle bending or the more complex dies for any of the combined bending and forming operations, CHICAGO induction-hardened dies offer bonus performance at no extra cost. Field reports on these dies show better than ten times the useful life of the conventional dies used in press brakes. Get the full particulars on CHICAGO dies for your next press brake job.



Heavy lines
indicate
hardened surfaces

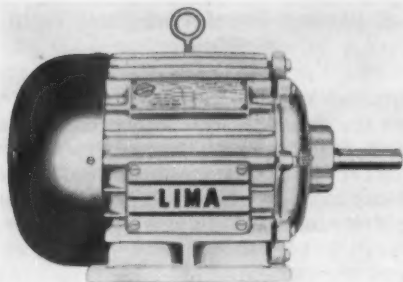
4915

Steel Bending Brakes for over 50 Years

DREIS & KRUMP
MANUFACTURING COMPANY

7418 S. Loomis Boulevard, Chicago 36, Illinois





Lima Type EX Explosion-Proof Motor

The unique design of the motor frame, incorporating deep, integrally cast fins, is said to provide extra cooling surface for rapid heat dissipation without increasing the diameter of the motor frame. At the same time, the design has no corners or pockets that can become clogged and retard cooling. A specially designed external fan forces air at high velocity over

the outside of the motor. The deep-drawn steel fan housing is said to provide proper direction to the air stream, resulting in a motor that "blows itself clean continuously." If desired, under extreme conditions of dirt or silt, a broom can be used to remove heavy deposits, as all motor cooling surfaces are exposed and readily accessible.

Machine Is Designed for High Speed Milling of Non-Ferrous Metals

Designated as the A-245, a machine which is designed for the high speed milling of non-ferrous metals and which utilizes hydraulic feeds and speeds has been announced by Onsrud Machine Works, Inc., 3924 Palmer St., Chicago 47, Ill. The machine affords manual feed for close adjustment. Outstanding features of the miller are centrally-located, simplified hydraulic

HIGH SPEED PRODUCTION CONTINUOUS OIL GROOVING

WICACO CONTINUOUS OIL GROOVER cuts grooves of all descriptions, internal or external, continuous or intermittent.

Send us samples for grooving. We will return them cut to specifications, with a record of time and cost estimate. No obligation.

*Ask For Descriptive Booklet And See
How You Can Improve Your Production.*

WICACO

MACHINE CORPORATION

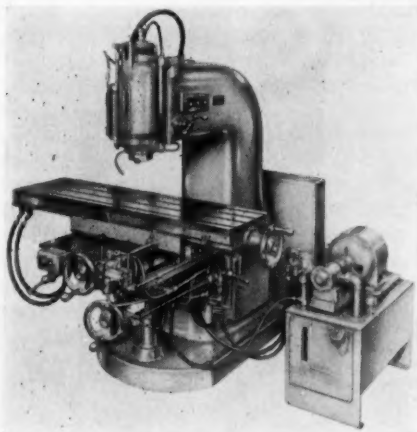
4801 STENTON AVENUE
WAYNE JUNCTION, PHILA. 44, PA.

Manufacturers of

Precision Machinery and Machine Parts
Roller Bearing Twister Spindles—Spindle Oiling Machine
—Screw Machine Products.



feed controls; directional, knee, cross and table feed controls with five forward and reverse positions, including rapid traverse; and table speeds ranging from 0 to 150 i.p.m. The machine utilizes a $7\frac{1}{2}$ to 15-h.p. 3,600/7,200-r.p.m. spindle motor which is raised or lowered by air and manually operated for close adjustment. Three valves actuate the hydraulic feeds of the table in all directions, and dogs limit the table travel, resetting the valves to "off" position. The knee can be



Onsrud A-245 Milling Machine

locked to any height with a gib clamp which is interlocked with the hydraulic lift. The gib must be unlocked before vertical travel can begin.

Push buttons for starting the cutter motor and high and low speed are mounted on the side of the head column. The cutter motor can be raised or lowered 8 in. by air pressure or manually. A gib clamp locks the cutter motor in position. The machine has a capacity of 19 $\frac{1}{4}$ in., less the cutter, in width and 28 in. in length. The table measures 14 x 26 in. and has a 28-in. travel. The cross slide travel is 14 in., and knee travel is 10 inches.

June, 1954

An Award of
CONFIDENCE
in Whitnons
Precision high-production
SPINDLES

For new Surface Grinders
or modernizing old
machines specify
Whitnons Spindles
and be confident.



Whitnons Surface
Grinder Spindles are
precision made for
faster stock removal
and finer finishes...

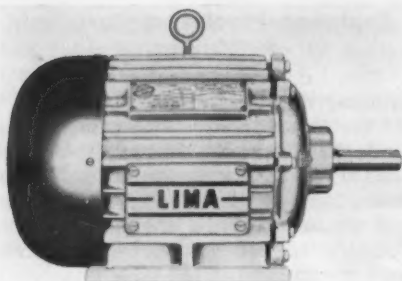
Ideal for the most unusual grinding applications. Whitnons spindles are dynamically balanced as a complete assembly—skillfully lubricated to guarantee long life under most adverse conditions. Heavy spring preloading prevents all endwise motion or deflection of the rugged alloy shaft.

be confident—count on

The Whitnons
MANUFACTURING CO.

217 High St.

New Britain, Conn.



Lima Type EX Explosion-Proof Motor

The unique design of the motor frame, incorporating deep, integrally cast fins, is said to provide extra cooling surface for rapid heat dissipation without increasing the diameter of the motor frame. At the same time, the design has no corners or pockets that can become clogged and retard cooling. A specially designed external fan forces air at high velocity over

the outside of the motor. The deep-drawn steel fan housing is said to provide proper direction to the air stream, resulting in a motor that "blows itself clean continuously." If desired, under extreme conditions of dirt or silt, a broom can be used to remove heavy deposits, as all motor cooling surfaces are exposed and readily accessible.

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HIGH SPEED PRODUCTION CONTINUOUS OIL GROOVING

WICACO CONTINUOUS OIL GROOVER cuts grooves of all descriptions, internal or external, continuous or intermittent.

Send us samples for grooving. We will return them cut to specifications, with a record of time and cost estimate. No obligation.

*Ask For Descriptive Booklet And See
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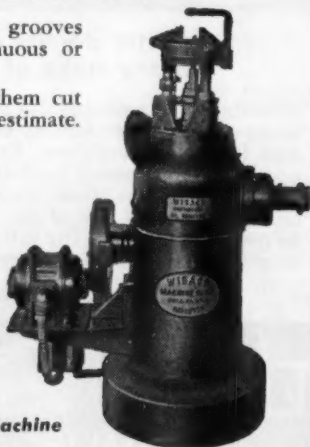
WICACO

MACHINE CORPORATION

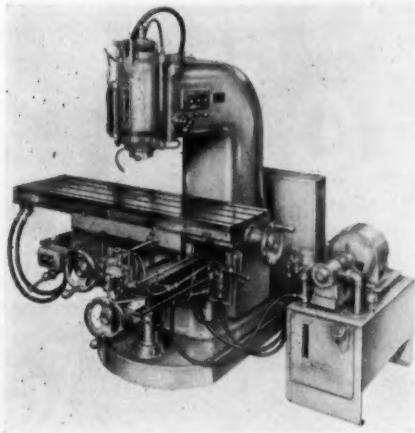
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WAYNE JUNCTION, PHILA. 44, PA.

Manufacturers of

Precision Machinery and Machine Parts
Roller Bearing Twister Spindles—Spindle Oiling Machine
—Screw Machine Products.



feed controls; directional, knee, cross and table feed controls with five forward and reverse positions, including rapid traverse; and table speeds ranging from 0 to 150 i.p.m. The machine utilizes a 7½ to 15-h.p. 3,600/7,200-r.p.m. spindle motor which is raised or lowered by air and manually operated for close adjustment. Three valves actuate the hydraulic feeds of the table in all directions, and dogs limit the table travel, resetting the valves to "off" position. The knee can be



Onsrud A-245 Milling Machine

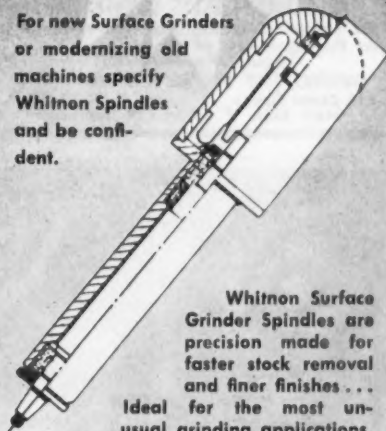
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June, 1954

An Award of
CONFIDENCE
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Precision high-production
SPINDLES

For new Surface Grinders
or modernizing old
machines specify
Whitnon Spindles
and be confident.



Whitnon Surface
Grinder Spindles are
precision made for
faster stock removal
and finer finishes...
Ideal for the most unusual grinding applications.
Whitnon spindles are dynamically balanced as a complete assembly—skillfully lubricated to guarantee long life under most adverse conditions. Heavy spring preloading prevents all endwise motion or deflection of the rugged alloy shaft.

be confident—count on

The Whitnon
MANUFACTURING CO.

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MODERN MACHINE SHOP 359

SOLD THRU LEADING SUPPLY HOUSES



GROBET CENTERLESS COUNTERSINKS

Six staggered cutting edges give shearing cut that eliminates all chatter.

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JIFFY JIG

This fast, accurate, low-cost collet-type work holder speeds secondary operation drilling, milling, tapping, etc., either horizontal or vertical.

• Guide bushing support (not shown) for cross hole drilling. • Spring ejector (optional) speeds work. • Simple, dependable, proven in service. Send for our folder.

RIGID PRODUCTS CO.
P. O. Box 162, Dept. M, Cincinnati 15, Ohio

**Unit Measures and Controls
Temperatures**

Designated as the "Safe-Temp," a portable electronic controller-indicator which can be used as an automatic temperature controller, an excess temperature cut-off or to verify temperatures of controllers in use has been announced by Blue M Electric Co., 306-308 W. 69th St., Chicago 21, Ill. The unit, it is claimed, will directly measure and control temperatures of ovens, furnaces, hot plates, kilns, glass mantles, liquid baths and other relat-



Blue M "Safe-Temp" Portable Electronic Controller-Indicator

ed controlled equipment. As an excess temperature cut-off, the controller will provide full protection, automatically shutting off the unit until manually reset.

Though portable, the controller-indicator can be wall mounted. Where atmosphere is hazardous or corrosion to electrical controls and components is prominent, the device may be remote wall mounted.

The Safe-Temp features a circuit breaker switch which gives full protection against shorts and overloads, and no fuses are required. The con-

troller is available in two scale ranges with either Chromel-Alumel or Iron-Constantan thermocouples. Each unit is supplied with an 18-in. long No. 8-gauge thermocouple and 10 ft. of lead wire. The controller is supplied with instrument case and cover, handle and wall mounting brackets, all of which are made of polished stainless steel.

Live Bushing Permits Use of Carbide Tools to Full Capacity

For piloting applications on various sizes and makes of boring mills, J. G. Jergens Co., 11106 Avon Ave., Cleveland, Ohio, has announced a roller bearing live bushing which is said to permit the use of carbide tools to their full capacity for heavy cuts at high speeds. The liner of the bushing rotates with the boring bar, minimizing scoring and wearing of the bar. Utilizing two sets of sealed, adjustable, pre-



Jergens Roller Bearing Live Bushings

cision tapered roller bearings, the live bushing, it is claimed, ensures constant rigidity and precision. The bushing is made to the maximum bar capacity of the boring mill and can be "bushed down" for precision adaptation to any smaller size bar or combination of bars.

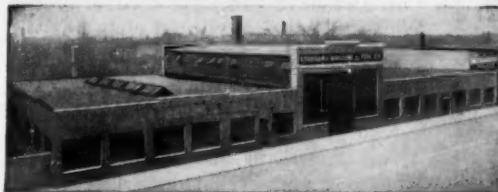


PERFORMANCE!

Modern industry demands TOP PERFORMANCE plus Economy from its production facilities. Both of these features are highly exemplified in this Standard Machine No. S. O. 4132.

Standard's 3 column hydraulic drilling, Counterboring and Taper Reaming machine is equipped with three Standard 25 H-P "DRILL-MASTERS," each column has 14-spindle head with tooling to suit successive operations. Fixtures are moved from station to station on a roller type conveyor. PART; SPROCKET. Operations: Drill, counterbore and Taper Ream Holes.

UNITED STATES SALES REPRESENTATIVES: ARNOLD J. WERNER CO., NEW CENTER BUILDING, DETROIT 2, MICHIGAN



**STANDARD
MACHINE AND
TOOL CO., LTD.
WINDSOR, ONTARIO**



MARK OF QUALITY

STANDARD WOODRUFF KEYS

We manufacture a complete line of Woodruff keys in all standard sizes. These sizes range from as small as $1/2'' \times 1/16''$ to keys as large as $3 1/2'' \times 3/4''$. All keys are carefully checked for burrs, slivers, etc., before being shipped to you. Only the finished tested keys are permitted to leave our plants.

We carry a complete stock of high quality, dependable keys. Send for our catalog for complete information on Woodruff keys, taper pins, machine keys, and machine racks.

STANDARD STEEL SPECIALTY CO.

BEAVER FALLS

PENNSYLVANIA

Plants: Beaver Falls, Pa.; Hammond, Ind.



CONTINUOUS HINGES

Manufactured by

**AUTO MOULDING
& MFG. CO.**

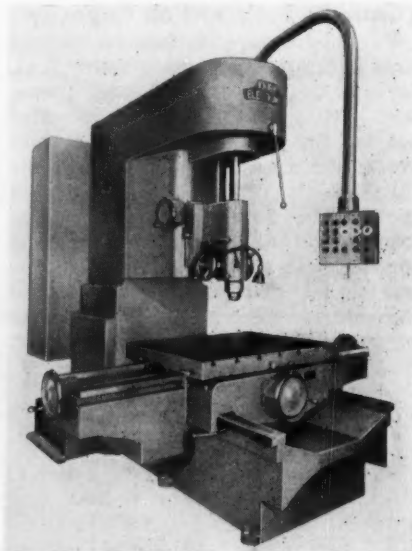
WRITE FOR STOCK LIST

1114 E. 87TH ST.

CHICAGO 19

Milling Machine Handles Work- pieces Weighing up to 5,000 Pounds

W. B. Knight Machinery Co., 3922 W. Pine Blvd., St. Louis 8, Mo., has announced a vertical milling machine, designated as the Electromill, which is said to be capable of boring, drilling and vertical milling workpieces as large as 30×48 in. and weighing up to 5,000 lb. All controls are located in



Knight Electromill

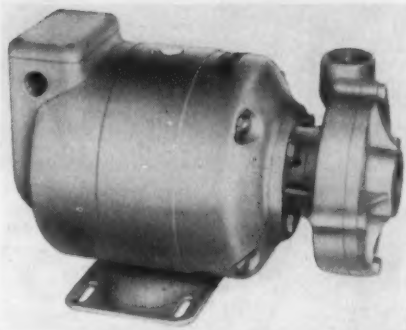
a single panel which can be moved to the most convenient position — front, back or side. According to the manufacturer, the operator can always work at the most advantageous location and have complete control of the table and spindle without changing his position. Both the spindle speed and feed can be changed without stopping the spindle.

Non-gear, easily-maintained direct drives are said to provide unusual smoothness of operation, and variable

speed motors, equipped with "Thymotrol" control, offer a complete range of infinitely variable speeds and feeds. It is claimed that a uniquely designed column and spindle head and an extra long quill provide the Electromill with a 35-in. throat capacity.

Centrifugal Pump Is Adaptable to Air Conditioning Installations

Designated as the Rumaco Model D-501, a direct-connected compact motor-driven centrifugal pump which is said to be adaptable to various air conditioning installations, including evaporative condensers, medium-size cooling towers, fountains and swimming pools requiring up to 40 g.p.m. at a 30-ft. head, has been announced by Ruthman Machinery Co., 1817 Reading Rd., Cincinnati 2, Ohio. The unit is bronze fitted and will handle water and other liquids without the danger of rust or corrosion even where



Rumaco Model D-501 Centrifugal Pump

used intermittently and during seasonable idle periods. The Model D-501 is equipped with a self-adjusting seal and is furnished with either $\frac{1}{4}$, $\frac{1}{2}$ or $\frac{3}{4}$ -h.p. motor.

No additional mounting bracket is required, as the pump can be installed either vertically or horizontally by

BIG JUMP FORWARD in Boring and Facing!

Our
Model "D"



All Models Have
POWER FEED
for Facing

• A Boring Head
that Won't Face
is Not Complete

Six
Sizes
Available



RE-DESIGNED
Many New Features

Write Today for Complete Details

CHANDLER TOOL COMPANY, MUNCIE, INDIANA

COMBINED BORING &

FACING TOOL HEADS

Chandler-Duplex

RAPID SET-UPS with extreme accuracy—every time and on the first try!



Brookfield
TOOL HOLDER

One Brookfield Tool Holder = One Conventional Tool Holder + Stock of at least 100 Bushings.

- Adjustable V Jaw
- Axially True Design
- Balanced-Pressure Locking

In Essence:
A Floating,
Precision Vise

No more fussing with bushings . . . just slip tool in jaw and tighten . . . run-out is less than .0001 per inch . . . Brookfield Tool Holders guarantee clean, easy, solid set-ups every time and on the first try! Models available for nearly all automatic and hand screw machines, turret lathes, radial drills, etc. Also useful as Adjustable Steady Rest and Work-Holder.

Write Dept. M for descriptive brochure.

BROOKFIELD, INC. 240 Cushing St.
Stoughton, Mass.

Over 85% of the torque wrenches used in industry are

Sturtevant
TORQUE WRENCHES
Read by Sight, Sound or Feel

- Permanently Accurate
- Practically Indestructible
- Faster—Easier to use
- Automatic Release
- All Capacities

in inch grams
...inch ounces
...inch pounds
...foot pounds

Every manufacturer,
design and production
man should have this valuable data. Sent upon request.

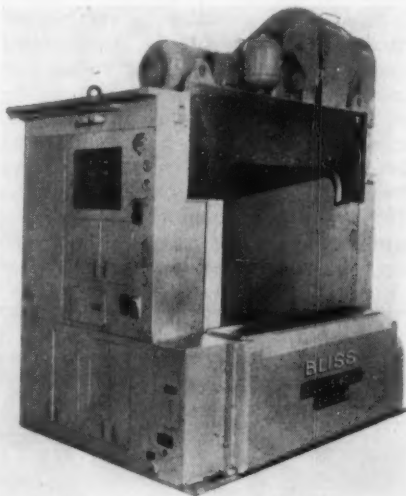


P.A. **STURTEVANT CO.**
ADDISON QUALITY ILLINOIS

using the standard integral Nema motor base. The pump has been designed with ribbed sections to minimize weight and retain strength and rigidity.

Streamlined Welding Press Has Built-In Piping, Controls and Wiring

E. W. Bliss Co., Canton, Ohio, has announced a welding press with all piping, controls and wiring located in-



Bliss 4L Series Welding Press

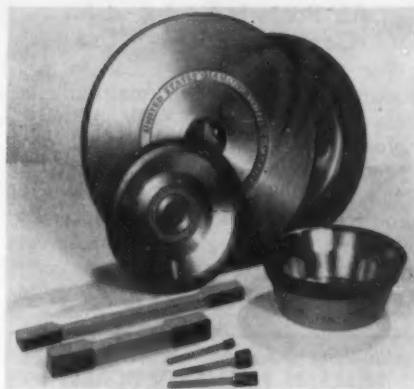
side a streamlined frame. Accessibility has been maintained while affording maximum protection to operating controls. Used for high-speed, automatic assembly of large metal sections, the press is available in four sizes with underdrive and conventional drive arrangements. The bed is 12-in. deep and can be supplied in widths ranging from 42 to 84 inches. Strokes of 8 and 10 in. or 8 and 12 in. can be furnished.

The press is available in two models; namely, the 4LU series and the 4L series. For use in shops with limited

headroom, the 4LU series is designed with the driving unit in the base. Where headroom is no object, the 4L series has the driving mechanism on top of the press. In the 4L series, the stroke can be changed without changing parts. In both series, the lower die, which is supported at four points to assure accurate positioning, moves up to contact a stationary upper die. The press can be built to accommodate practically any size section.

Resinoid Bond Diamond Products

United States Diamond Wheel Co., 837 Illinois Ave., Aurora, Ill., has announced the "Pressurelok"-224 Resinoid Bond which is now available in all the company's diamond grinding products. According to the manufacturer, the Pressurelok method of bonding diamond into a diamond wheel guarantees the ultimate cutting life from each diamond particle in the wheel



U.S. "Pressurelok"-224 Resinoid Bond Diamond Products

and allows the diamond to be held securely and cut freely without hindrance from bond smear. The PL-224 diamond wheel is said to maintain shape, cut fast and have a long life.



New and Useful!

No. 111

WHITNEY-JENSEN

HAND PIPE CRIMPER

WEIGHT
ONE POUND

PRICE ONLY
\$6.50
F.O.B. FACTORY

SAVE
TIME
ON THE
JOB!

There are many times when you want to put a few quick crimps in a pipe-end, a duct, or an edge. HERE is the tool to do it! Light-weight, easy to use, and easy to carry in your kit. Makes good crimps any length up to 1½ inches. Capacity 20-gauge galvanized sheet or the equivalent. Spring-return jaws. Polished handles. A Whitney-Jensen QUALITY Tool. Order yours today...

Write for our...
NEW CATALOG
SHOWING OVER 75 USEFUL TOOLS

GOOD METAL-WORKING TOOLS SINCE 1910
WHITNEY METAL TOOL CO.
110 FORBES STREET, ROCKFORD, ILLINOIS

Air Press Is Designed for Continuous Heavy Use

For continuous heavy use in production, assembly and maintenance, Van Products Co., 3770 W. 12th St., Erie 2, Pa., has announced the "Vi-Speed" Power House Bench-Type Air Press which is said to be capable of assembling, bending, straightening, punching, stamping, trimming, riveting, broaching, crimping and swaging. The press utilizes Vi-Speed air cylin-



"Vi-Speed" Power House Bench-Type Air Press

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.



Write for Circular
NIELSEN TOOL & DIE COMPANY
P. O. Box 1067
Berkley, Mich.

NON-ROTATING DRILL STOP for Precision Hole Depth Control



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(Patent Pending)

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for Increased Productivity

KENNAMETAL Inc.
LATROBE, PA.



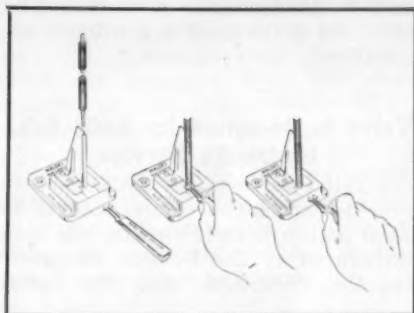
CEMENTED CARBIDE TOOLS,
BLANKS, MILLING CUTTERS



Dispenser for Crescent and E-Shaped Retaining Rings

A dispenser for Waldes Truarc crescent and E-shaped retaining rings has been introduced by Waldes Kohinoor, Inc., 47-16 Austel Place, Long Island City 1, N. Y. The unit has two major components; namely, a machined, weighted base which may be secured to the top of a bench or assembly table and a bracket assembly consisting of a bracket, shim plate and spring rail. The bracket assembly is fastened to the base with two removable round-head screws.

In loading the dispenser (see left illustration), the tongue of the stack-rod, which is included with the unit, is inserted into the narrow groove in the top of the spring rail. When the shoulders of the tongue come to rest squarely on the top of the spring rail, the rings are permitted to slide down to the base. In gripping the ring (see center illustration), the proper size



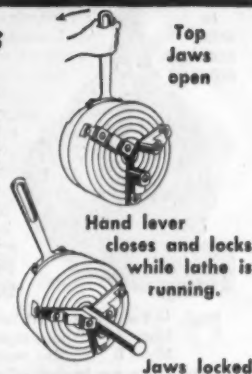
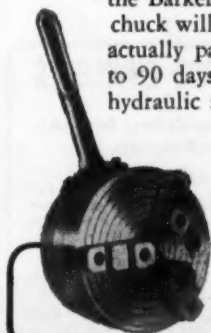
Drawings of Waldes Truarc Dispenser showing (left) manner in which the dispenser is loaded, (center) manner in which the ring is gripped and (right) manner in which the ring is extracted

Waldes Truarc applicator is placed in contact with the surface of the base and pushed forward in the shim plate opening until it grasps the bottom ring in the stack. In extracting the ring (see right illustration), the applicator is withdrawn with the ring grasped

Labor Saving Production CHUCK

Will pay for itself in 60 to 90 days

On turrets, engine lathes, cutting-off machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while doing it in from 60 to 90 days. Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with lathe running or stopped. Over 30 years of labor saving, production boosting operation.



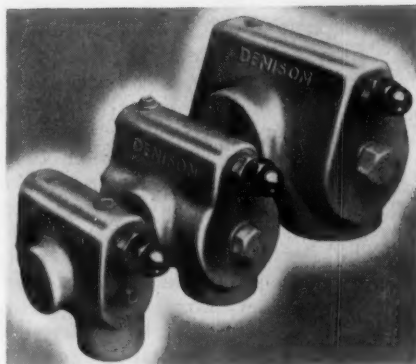
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CHUCK DIVISION
THOMAS HOIST CO.
28 S. HOYNE CHICAGO 12, ILL.

flush to the underside of the tool. The next ring in the stack is positioned automatically for extraction.

Valve Is Designed for 2,000 P.S.I. Hydraulic Service

A relief valve which is designed to provide efficient pressure control in 2,000 p.s.i. hydraulic circuits has been introduced by The Denison Engineering Co., Columbus, Ohio. The valve,



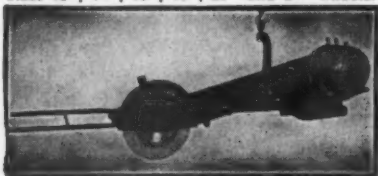
Denison 2,000 P.S.I. Relief Valves

which is light and compact in construction, is furnished with threaded body for in-the-line or tee'd connections. The valve is available in pipe sizes of $\frac{1}{2}$, $\frac{3}{4}$, $1\frac{1}{4}$ and $1\frac{1}{2}$ in. and may be vented or operated by remote control. Pressure regulation from 100 to 2,000 p.s.i. is available in the $\frac{1}{2}$, $\frac{3}{4}$ and $1\frac{1}{4}$ -in. sizes, and pressure settings from 150 to 2,000 p.s.i. are possible in the $1\frac{1}{2}$ -in. size. According to the manufacturer, variations in line volume have little effect on opening or closing.

Pressure settings are regulated by adjusting a single screw. A removable acorn nut covers the pressure screw for positive oil seal. The valve can also be used as a safety valve for volumes greater than its rated capacity.

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Sizes 12", 14", 16", 18", 20" and 24" wheels.



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Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments. All grip...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

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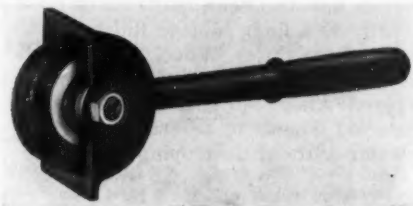
WADE INSTRUMENT COMPANY

Dept. M, R.F.D. No. 1,

Chardon, Ohio

Grinding Wheel Dresser Utilizes 3-Inch Diameter Abrasive Wheel

Designated as the Crackerjack Jr., a grinding wheel dresser which utilizes



Desmond Crackerjack Jr. Grinding Wheel Dresser

an abrasive wheel measuring 3 in. in diameter x 1 in. face has been announced by The Desmond-Stephan Mfg. Co., Urbana, Ohio. In operation, the dresser is brought in contact with the grinding wheel at a slight angle (15 degrees). The abrasive wheel of

the unit is mounted in a heavy metal housing and is held securely by locking nuts. Hardened steel bearings, which are protected from dirt and abrasive, are said to provide for efficient operation.

The dresser incorporates its own lubrication system, using a wick which discharges oil while the cutting wheel is in motion. Replacement abrasive wheels are available and can be installed easily when necessary.

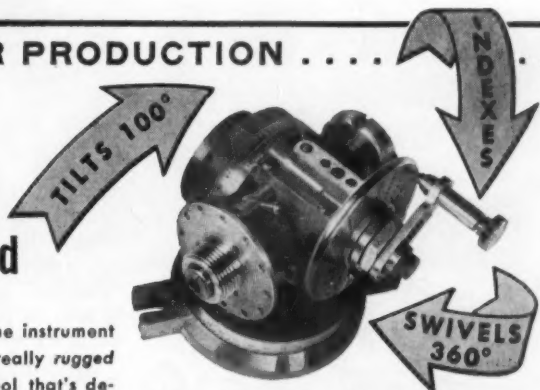
Redesigned Hob Sharpening Machine Allows the Use of Coolant

The No. 10-12 Hydraulic Hob Sharpening Machine, manufactured by Barber-Colman Co., 655 Rock St., Rockford, Ill., has been redesigned to accommodate wet grinding of high speed steel and carbide-tipped hobs and form-relieved cutters. New wheel spindle and work spindle are fully pro-

FOR FASTER PRODUCTION

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Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11"



swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

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**LAY-OUT AND
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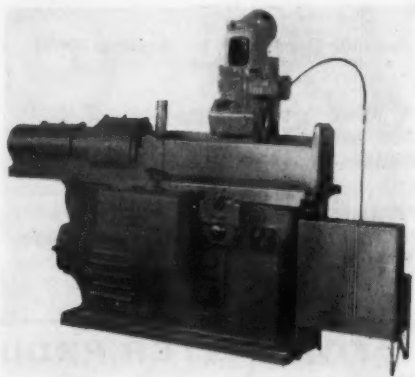
8615 Grinnell Ave. • Detroit 13, Mich.

SAWING
SHARPENING



**GROB
BROTHERS**
GRAFTON WISCONSIN

tected against the effects of coolant. Splash guards, coolant tank and motor are available as extra equipment which may be ordered for installation on a standard machine. In addition to the fully protected spindles, the wheel spindle has also been made more rigid to provide a finer surface finish on the faces of the flutes. Wheels are mounted on an adapter which fits onto the tapered wheel spindle, thus allowing diamond wheels to be trued on a tool grinder without destroying their true-



Barber-Colman Redesigned No. 10-12 Hob Sharpening Machine

ness when remounted on the No. 10-12 machine. The wheel motor is mounted parallel to the wheel spindle, and the drive is through a Gilmer "Timing" Belt. An improved dresser is said to provide for easier and more accurate setting of the diamond.

According to the manufacturer, the machine is capable of handling a wide variety of tools with straight or helical flutes, shell or shank type, up to 10 in. in diameter x 12-in. face width. All elements of the machine cycle can be accomplished automatically by making the proper settings on conveniently located controls. When the proper settings have been made, the machine automatically indexes and

feeds to remove the desired amount of metal from each flute. Table speed is variable by adjusting the hydraulic flow control valve.

Tool Sets Provide for Complete Lathe Service

J. H. Williams & Co., 408 Vulcan St., Buffalo 7, N. Y., has announced six lathe tool sets which provide for turning, boring, knurling, cutting off and side work with a minimum number of tools. The sets include high speed cutters and wrenches in strong steel cases which are fitted with clips for the holders. The sets will accommodate lathes with swings ranging from 7 to 36 inches.

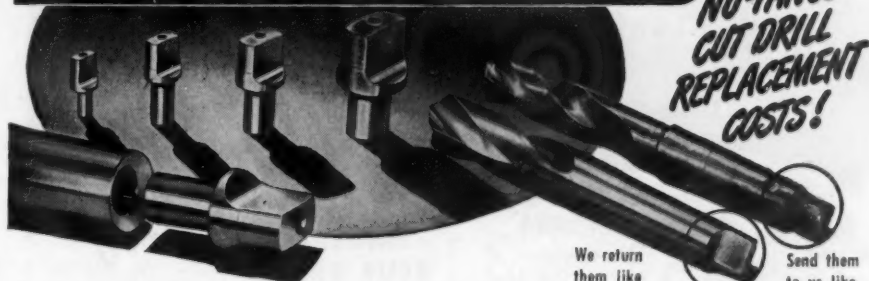
Each set includes three Williams turning toolholders with straight, right and left-hand shanks; three cutting-off and side tools with straight, right and left-hand shanks; one bor-



Williams Lathe Tool Set

ing tool with sleeve bar; one threading tool with formed cutter; and one knurling tool complete with one pair of knurls.

NEW DRILLS FROM OLD WITH NU-TANGS



Send us your old drills—we'll make them new again at a fraction of the cost of a new drill! Exclusive NU-TANG* process replaces twisted or broken tangs with brand new tangs of correct size—and with **GUARANTEED ORIGINAL STRENGTH**. No welding—No distortion—No shortening of drills—No sleeves.

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Any drill, reamer, or other tool with a Morse taper in sizes 2 to 6 can be repaired perfectly this quick new way. Delivery—One week. Used by many leading industrial plants. Amazingly low cost—satisfaction guaranteed! Send for complete information.

* Patent No. 2,512,033

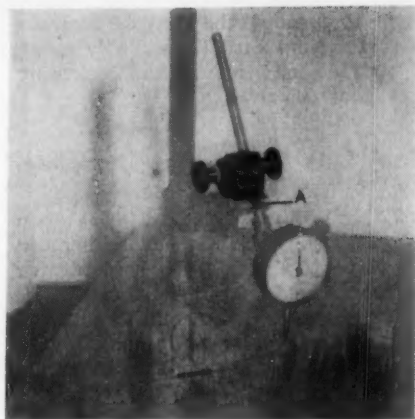
NU-TANGS INC. 1339 Bates Street
Cincinnati 25, Ohio

*write
today*

Fine-Adjustment Sliding Swivel Provides Smooth, Precise Indicator Setting

Smooth, positive positioning of dial gages graduated in ten-thousandths is said to be readily accomplished without tapping or otherwise jarring the indicator rod by a fine-adjustment sliding swivel developed by L. A. Rocheleau Tool & Die Co., 649 N. Main St., Leominster, Mass. The rigid device has a separate clamp for each rod ($\frac{1}{8}$ " or $\frac{3}{16}$ "-in. sizes) by which approximate setting of the indicator can be quickly completed. Final, precise positioning is then smoothly and accurately made by a slight movement of a convenient lever shown at A in the accompanying illustration. All adjusting is done with the device itself.

Applications of the sliding swivel cover a wide variety of inspection, toolmaking and general machining operations. As a complete unit, the swivel may be attached to any indica-

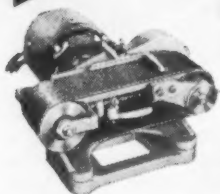


Rocheleau Fine-Adjustment Sliding Swivel
in use

tor base, or the fine-adjustment mechanism may be used on boring, milling, shaping or planing machines or fixtures requiring the use of a dial indicator.

**DOES IT BETTER
DOES IT FASTER**

2



SIMPLEX-M ABRASIVE BAND GRINDER

The precision of a machine tool plus the durability of a workhorse. Complete with $\frac{1}{2}$ H.P. Heavy Duty Motor and automatic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

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Up to 2" Length

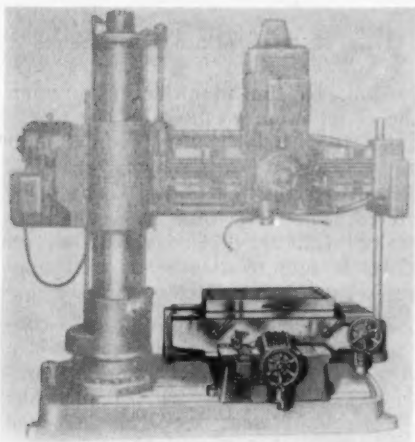
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CENTERLESS
GRINDING CO.**

6605 CEDAR AVE. Phone EN 1-3412 CLEVELAND 3, O.

Automatic Positioning Table for Use with Radial Drills

The Fosdick Machine Tool Co., Cincinnati 23, Ohio, has announced an automatic positioning table, available as a separate unit, which is designed for use with radial drills. According to the manufacturer, the automatic positioner gives exact reproduction of precision drilled, bored, tapped and reamed parts without jigs and without setting stop adjustments. Once two simple duplicating bars are prepared, po-



Fosdick Automatic Positioning Table installed on radial drill

sitioning of work is said to be accomplished automatically at the touch of a button, accurate to a plus or minus 0.0001 inch.

The two easily made, easily stored duplicating bars serve as a permanent record of positions for a particular job and may be stored and used for repeat jobs in the future.

The positioner can be easily installed for use with existing rigid, radial equipment. Because the positioner moves with the workpiece, the radial is used in planned position with the spindle located stationary.

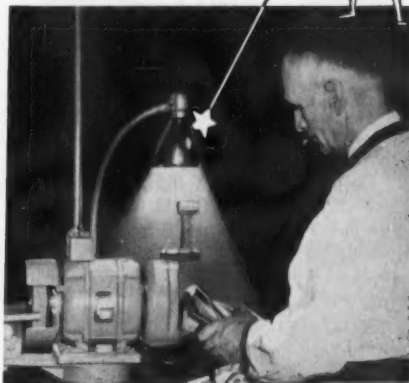
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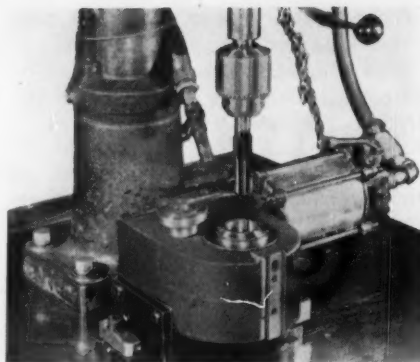
109 Brayton St.

Buffalo 13, N. Y.

MODERN MACHINE SHOP 373

Collet Chuck Is Actuated by Heavy-Duty Air Cylinder

Lynair, Inc., Jackson, Mich., has announced an air-operated collet chuck which is actuated by means of a heavy-duty air cylinder through a gear train, the collet being held stationary in position at all times by a lock-ring in the bottom of the fixture. The collet is opened and closed by a separate sleeve on the outside of the collet. Ac-



Lynair Air-Operated Collet Chuck in use

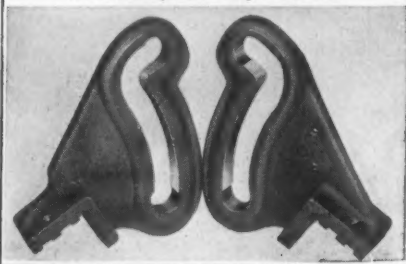
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Details on request.
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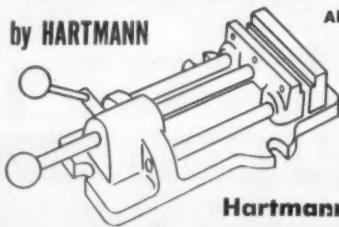


cording to the manufacturer, when the collet is once closed on the work-piece, it will not release even though air pressure failure may occur, thus permitting the machining to be completed. The fact that the collet remains stationary in position at all times is said to assure the user controlled depth on all parts.

The chuck is a completely self-contained unit and can be mounted in either a horizontal or vertical position. The unit can also be furnished with an expanding type collet to hold on the i.d. of a part, permitting machining operations on the outside. The chuck has a capacity ranging from $\frac{1}{16}$ through $3\frac{1}{4}$ inches. Stock diameter up to 1 in. can be passed through the collet.

INSTANT ACTION

by HARTMANN

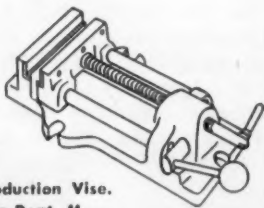


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All Purpose Tool Room And Machine Shop Vises.

The JAWSET

Adjustable Pressure Production Vise.
For Information Write Dept. M.

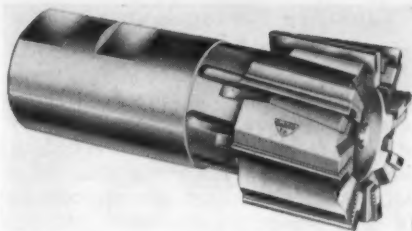


Hartmann Mfg. Co., 1637 Goold St., Racine, Wis.

Straight Shank Heavy-Duty Carbide Blade End Mill

Goddard & Goddard Co., Detroit 23, Mich., has developed a straight shank heavy-duty carbide blade end mill which is available in two series, one for milling cast iron and non-ferrous materials and the other for milling steel. The blades carry a grade of carbide suitable to its particular milling operation. The end mill has a 2-in. diameter shank, and cutting faces range from 2 to 4 in. in diameter. The tool incorporates the "Serratip" blade, which is a relatively thick carbide blank brazed to a very thin metal backing, thick enough only to provide a serrated surface. The Serratip design feature is said to permit a fine pitched carbide tooth cutter with the advantages of inserted blade construction.

The end mill is suitable for general purpose end milling. Inserted blade



Goddard & Goddard Straight Shank Heavy-Duty Carbide Blade End Mill

construction provides for ease of servicing, adjustment and continuous use of the body, and blade and body serrations are 1/16-in. pitch and parallel to the axis, providing for easy maintenance of diameter size. Blade adjustment permits a range of from $\frac{1}{8}$ to $\frac{1}{2}$ in. of effective tool and grinding life on the diameter. Blades are securely held in the body by a wedge lock.

SAVE COSTLY SET-UP TIME!

Instant Pin-Point Positioning
with these NEW MAGNETIC BASE
DIAL INDICATOR HOLDERS

"TINY-TITAN

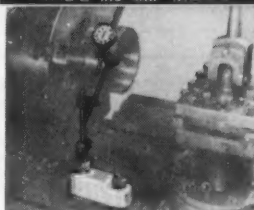
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Magnetic Base
Indicator Holder
with Precision
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- ✓ New, 3-Step Universal Rod in 7/32, 1/4 and 5/16" diameters, for all indicators.
- ✓ Mounts to flat or down to 3/4" round surface with 65 lb. pull.
- ✓ Adaptor permits full 360° adjustment in all directions.
- ✓ Many other new features.

PRICE: \$9.50,
Attractively Boxed.



Model 160 being used to indicate workpiece on Engine Lathe

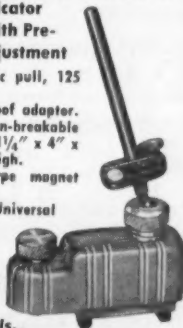
"TINY-TITAN

NO. 160"

Heavy Duty, Duplex Magnetic
Base Indicator
Holder with Pre-
cision Adjustment

- ✓ Magnetic pull, 125 lbs.
- ✓ Fool proof adaptor.
- ✓ Case non-breakable tenite, 1 1/4" x 4" x 1 1/2" high.
- ✓ Jack type magnet release.
- ✓ 3-Step Universal Rod.

PRICE:
\$17.75,
Attractively
Boxed.



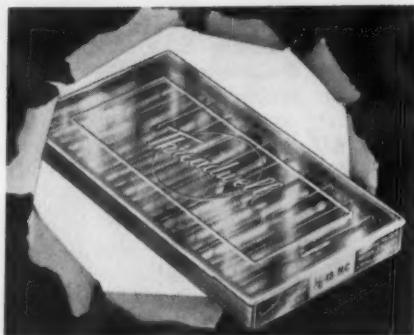
Send for Bulletin No. 605, covering other Tiny-Titan tools.

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Sold all over the U.S. and Canada
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Taps Are Packaged in Plastic Boxes

Threadwell Tap & Die Co., Greenfield, Mass., has announced life-time plastic packages for its complete line of taps from No. O M.S. through $\frac{1}{2}$ inch. The boxes will cover this range with three sizes, each accommodating 12 taps, separately cradled in individual recesses. Among the many features offered by the package, in addition to its attractive appearance, is



Threadwell Taps packaged in plastic box

MARK and DEMAGNETIZE IN ONE OPERATION

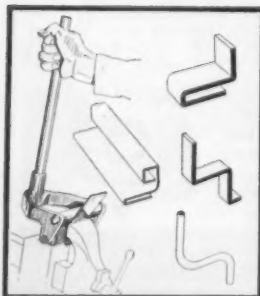


The Luma combination etchtool and demagnetizer, etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil. Write for complete information.

Luma Electric Equipment Co.
P. O. BOX 132-MS TOLEDO 1, OHIO

the clear crystal cover which enables quick, easy identification of the contents and the quantity by the user. Built-in partitions protect the fine cutting edges from one another, and a locking device keeps the sliding cover closed in transit. Moreover, each box is enclosed in a cardboard sleeve to assure perfect condition despite rough handling. Each box is provided with nesting ribs on the cover and on the bottom for convenient, safe stacking on tool crib shelves.

Labels for the package have been carefully designed to indicate important information clearly and concisely and are color-coded to designate types. Even specials carry complete data regarding finish, over or under-size, and so on, on an extension which runs up under the transparent cover.



SIMPLIFY YOUR BENDING JOBS with a BENDIT, JR. — \$12.95

New—Low Cost—Versatile—Easy to use

Bends 18 gage steel, 6" wide;
16 gage, 3" wide; $\frac{1}{8}$ strip, 2"
wide; 3/16 strip, 1" wide; $\frac{3}{8}$
dia. bar stock.

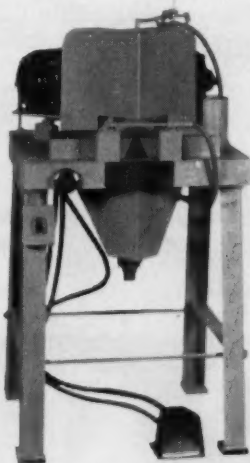
Fits standard machinist's vise with
jaws up to 4 $\frac{1}{2}$ " width. Use it for
production samples, maintenance
work, experimental projects, etc.

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N. Y. OFFICE: ELEVEN BROADWAY — Tel. WH 4-5480-1
Manufacturers of Bendit, Bendit, Jr. and Curvit Metal Forming Machines

Machine Cuts Two 45-Degree Miters in One Operation

Designated as the Model DM-10, a two-head mitering machine which is designed for cutting two complete 45-degree miters in one operation has been announced by Stone Machinery Co., Inc., 719 Fayette St., Manlius, N. Y. Engineered essentially for cutting extrusions in aluminum, brass and copper, the machine is built for high-



Stone Model DM-10 Miter Machine

volume production. The entire cutting cycle is completely automatic and is activated by hand or foot-operated controls. The machine is furnished complete with all motors, four Si-Maloy 10 in. saw blades, oil mist spray for longer blade life, controls, and so on, for immediate cutting when attached to an electrical source.

Lathe Bores and Turns Workpieces with Irregular Contours

The American Tool Works Co., Cincinnati 2, Ohio, has introduced a combination lathe for boring and turning

... *the Quality Line*

STEEL Stanho PRODUCTS

Stainless Steel TAPER PINS

Complete stock, all sizes #7/0 through #14.
Special sizes to order.
Milled or Centerless Ground (Precision Type)
Made to accurate tolerances.

Also "Stanho" Taper Pins made from selected screw stock, Monel, Brass, Aluminum or other metals. Clean bright finish — prompt shipments.

Write for description and prices.

STANDARD
SINCE 1872
HORSE NAIL CORP.
NEW BRIGHTON, N.Y.

FLEX-TIP*

BLOW GUNS 1/4" and 1/2"

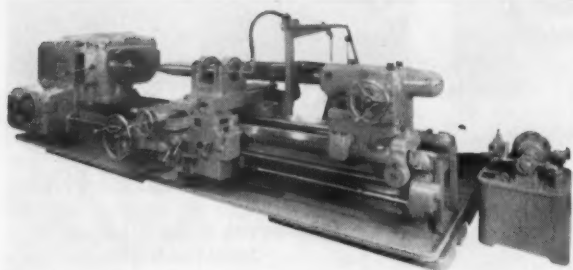
- for split-second cleaning
- just flex nozzle to release air — from puff to blast
- finger-tip control

Lever and Button Types also available.
*Reg. U. S. Pat. Off.

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American Combination Contour Boring and Turning Lathe

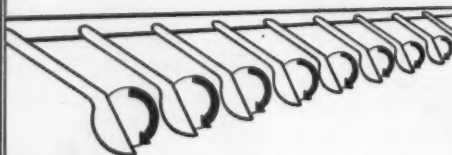
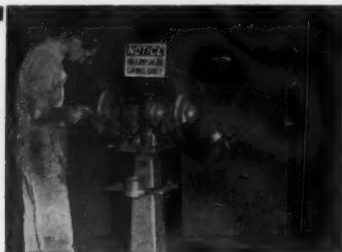
workpieces having irregular contours as deep as 8 in. on a side. The basis of the machine is a 25-in. "American" 50-H.P. Pacemaker equipped with hydraulically actuated cross slide which follows the contour of the flat work template, causing the cutting tool to reproduce the template shape on the work. Interchangeable boring and turning rests are furnished, providing for rapid changeover from boring to turning and vice versa. The boring rest is

for maximum rigidity. Cutting coolant is introduced to the tool through the center of the boring bar.

For contour turning operations, the boring rest is replaced by a compound rest with a heavy-duty double-screw toolholder. According to the manufacturer, the combination contour boring and turning lathe is particularly adapted to machining the intricate work contours encountered in jet engine and guided missile production.

STOP DUST

With **DUSTKOP**



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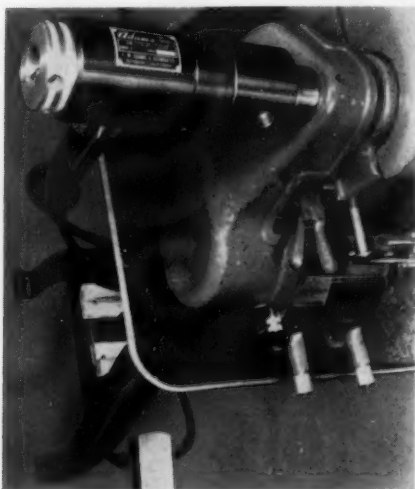
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Adams Air Operated Collet Closer installed on a lathe

designed for spindle speeds up to 4,500 r.p.m. Action of the closer is produced by an air operating piston working on a cam and dog action. By controlled hand adjustment, draw-bar pull, it is claimed, can be instantly changed from 0 to 5,000 lb. without changing air pressure.

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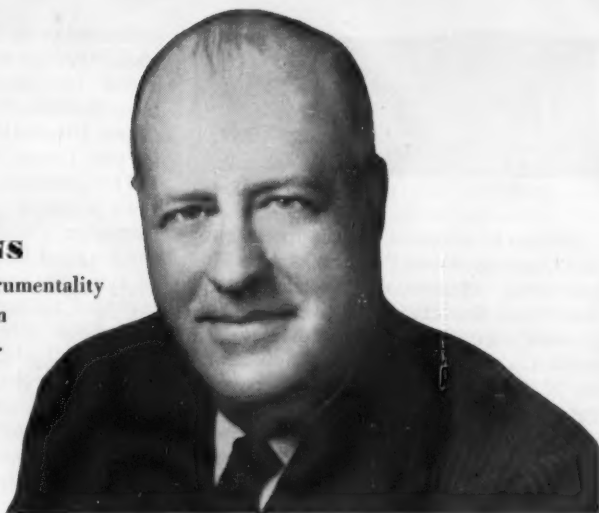
who is cutting various kinds and sizes of metal, calling for different blade specifications, has been announced by Henry Disston & Sons, Inc., Tacony, Philadelphia 35, Pa. Each box contains 100 12-in. blades with from 14 to 32 teeth to the inch and in varying proportions based on average cutting conditions, thus providing the correct blade for almost every type of metal-cutting job and resulting in maximum cutting performance from each blade.

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Book Reviews

Metals Properties. Edited by Samuel Hoyt and sponsored by the Metals Engineering Handbook Board of the American Society of Mechanical Engineers. Published by McGraw-Hill Book Co., 327 W. 41st St., New York 36, N. Y. Cloth binding, board covers. Price, \$11.00.

The second in a series of four volumes comprising the A.S.M.E. Handbook, this book contains a wealth of tabulated engineering data on the metallurgical, physical, fabrication and mechanical properties of typical metals and alloys. In convenient chart and table form, the book provides data on more than 500 metals in common industrial use, such as A.I.S.I. and A.S.T.M. steels, cast copper alloys, aluminum alloys, tin, magnesium, and so on. Tabulated under each of the metals listed is such information as the chemical composition of the metal; its brittleness, heat treatments and other characteristics; its industrial uses; treatment temperatures for forging, annealing, quenching, and so on; and technological properties, such as recrystallization temperature and hot working temperature.

Graphics in Engineering and Science. By Alexander S. Levens. Published by John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. 696 pages. Illustrated. Cloth binding, board covers. Price, \$7.00.

The principal objective of this book is to promote the use of graphics as a language. Employed concurrently with the English language and the language of symbols, graphics becomes a working tool rather than an end in itself. The book stresses fundamentals and their applications to the problems that arise in technology. Part I, dealing with orthogonal projection, applies basic concepts to a variety of problems and emphasizes the analysis necessary for their solution. In Part II, the author deals with recognized standards, the importance of technique and the development of facile freehand drawing as a means toward intelligible expression. Part III is concerned with graphical solutions and computations. Characterized by a complete integration of its three major divisions, the book demonstrates the effective application of graphic elements to design, research and development, and invites further coordination with such topics as mathematics, mechanics and strength of materials. The author presumes a reasonable proficiency in the use of instruments, lettering and simple geometric constructions, but provides thorough references to this background material in six appendices.

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the "Where to Get It" section of MODERN MACHINE SHOP provides a quick reference to machinery, tools and supplies advertised in the current issue. Use it consistently. You'll find it's very helpful. (See pages 400, 402, 404 and 406.)

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Accompanying the book are two workbooks, the first coinciding with Part I of the text and the second relating to Parts II and III. The workbooks, of equal length, contain 74 double leaves and are priced at \$4.00 each.

Ferrous Process Metallurgy. By John L. Bray. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 414 pages. Illustrated. Cloth binding, board covers. Price, \$6.50.

Intended as a college textbook on the reduction and refining of metals, this book has been written with the following objectives in mind: (1) the subject matter can be covered in a junior or senior course meeting three or four hours per week for a 16-week semester; (2) much of the historical matter, properties of alloys, statistics of the industry, pricing system and

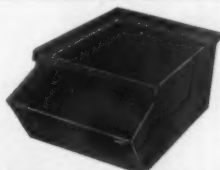
minor processes have been omitted, but the instructor is urged to discuss these matters in class; and (3) fundamental thermochemical data now being available, free use is made of the indispensable tool of physical chemistry in explaining the processes and predicting future developments. The contents of the book include eight chapters; namely, Raw Materials, The Iron Blast Furnace, Wrought Iron, The Bessemer Process, The Basic Open Hearth Process, The Acid Open Hearth Process, Electrical Furnaces, and Ingots and Ingot Molds.

Machinery's Handbook. Fifteenth Edition. By Erik Oberg and Franklin D. Jones. Published by The Industrial Press, 148 Lafayette St., New York 13, N. Y. 1911 pages. Illustrated. 4½ x 7 inches. Price, \$9.00.

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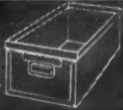


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and basic information, data and formulas that the handbook user in the mechanical field needs to keep abreast of current developments. Of particular interest in the fifteenth edition are a revised and rearranged spur gear section and an entirely new section on generated bevel gears. Featured in the spur gear section is a greatly enlarged presentation of standard definitions and terms; formulas and tabulated data for readily determining the dedendum and root diameters for hobbing and shaping preshaved gears; full data and information on fine-pitch spur gears, including tolerances for gear blanks, and data for enlarged pinions; and recommendations and tabulated data for obtaining the proper amount of backlash in various types of gears. In the bevel gear section, the various types of bevel gears and their applications are described. A new section on fine-pitch worms and worm gears has been added in which the step-by-step design procedure is outlined. Important changes in the dimensions of

American Standard square and hexagon bolts and nuts are summarized, with a table comparing the old and new across-the-flats dimensions. Thread classes, thread form, allowances, tolerances, limiting dimensions and preferred thread series of the American Standard General-Purpose Acme and Stub Acme screw threads are given in the extensive and detailed screw thread section. The section on ball, roller and needle bearings is completely new and gives in considerable detail and scope the descriptions, designations, ranges of standard sizes, boundary dimensions and tolerances for standard anti-friction bearings. Also outlined is the Anti-Friction Bearing Manufacturers Association plan for bearing designation. These highlights can only indicate some of the more important features of the new and revised material which has been incorporated in this fifteenth edition.

Metals and How to Weld Them. By T. B. Jefferson and Gorham Woods. Published by The James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio. 322 pages. Illustrated. Cloth binding, board covers. Price, \$2.00 in U.S.A., \$2.50 elsewhere.

This volume is a combination text and reference book designed to give all users of welding a practical work knowledge and source of information for designing and making better welds at lower cost. Prepared primarily for the student, welding operator, supervisor, instructor, engineer, designer and manager, the book has been organized and written to explain in clear, logical, readily understood steps, the structure and properties of metals and how to weld them. The first six chapters are devoted to elementary discussion of metals, their mechanical and physical properties and uses. The fundamentals of metallurgy and their significance in heat treating are explained



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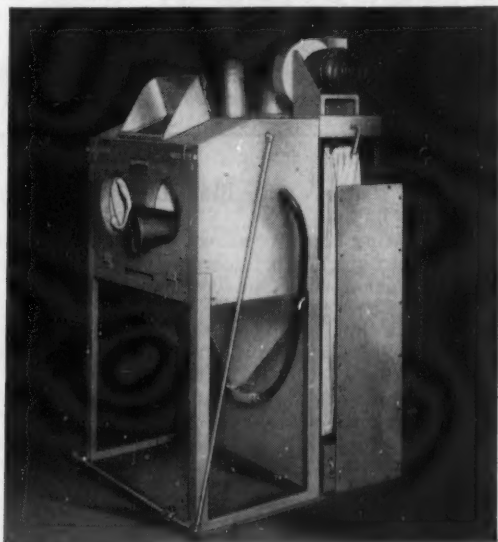
in logical steps. This information is then related to correct welding procedures for steels, cast iron, non-ferrous materials and hardfacing. All commonly used types of metals are covered.

The final section of the book is devoted to a wealth of information for making good welds, trouble shooting and cost estimating, and the book provides a complete explanation of welding terms.

Lubrication of Industrial and Marine Machinery. Second Edition. By the late William Gordon Forbes, revised by C. L. Pope and W. T. Everitt. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 351 pages. Illustrated. Cloth binding, board covers. Price, \$6.50.

Addressed to the man responsible for the keeping and care of mechanical equipment, this second edition develops and evaluates, in lucid terminology, the fundamental facts basic to an engineer's understanding of present-day lubricating systems. Thoroughly revised to

include major contemporary developments in the field, the book explains graphically how you can put to best everyday use the fundamental characteristics of conventional lubricants. It interprets, in detail, the chemistry, refining, compounding and specifications of the subject and dwells at some length on the limitations to which certain types of lubricants can be extended. The topics in the book are arranged in sequence.



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Elementary Fluid Mechanics. By John K. Vennard. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 401 pages. Cloth binding, board covers. Price, \$5.50.

This third edition has undergone important changes to increase its value to the beginner who has no experience in fluid phenomena. The author has retained the pattern, level and general approach of his work, but has carefully reviewed and revised various pertinent points. A new introductory chapter, for example, deals with generalizations on the subject of one dimensional fluid flow, while more problems have been added. Sacrificing

mathematical rigor and detail in favor of physical pictures, the author also has stated only general laws in many cases in order to convey basic ideas. The book includes material which not only covers the fundamentals, but which has the maximum chance of practical use.

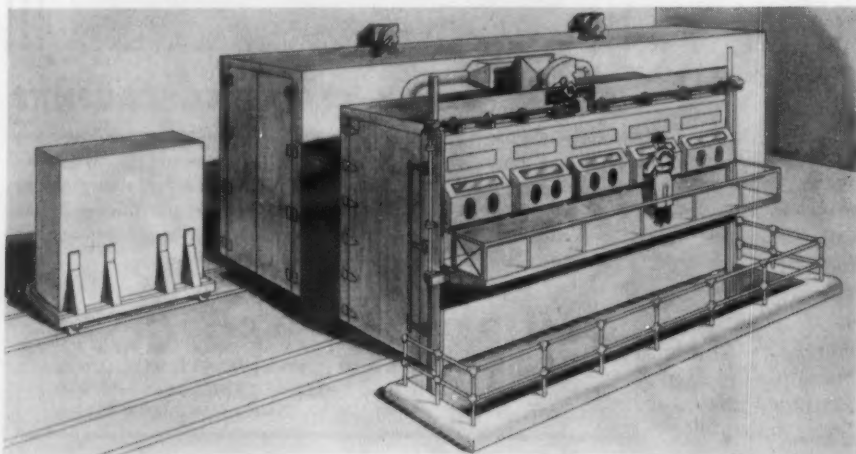
How to Use Portable Power Tools.

By Maurice H. Reid. Published by Thomas Y. Crowell Co., 432 Fourth Ave., New York 16, N. Y. 210 pages. Illustrated. Cloth binding, board covers. Price, \$2.95.

This is a complete up-to-date book

Huge Vapor Blast Liquid Honing Machine

THE wash drawing herewith shows what is believed to be the largest vapor blast liquid honing machine ever built. Designed and developed by the Vapor Blast Mfg. Co., Milwaukee, Wis., the five-position machine was shipped recently to the Wyman-Gordon Co., Worcester, Mass., where it will be used to clean and finish huge forging dies measuring up to 10 x 20 ft. and weighing as much as 100 tons. When installed, the equipment will occupy a floor space of approximately 20 x 60 ft. and will be located in a 10-ft. deep base pit out of which it will extend more than 14 ft. high from the floor level. Die finishers will work from a specially designed elevator platform which will move up and down along the faces of the dies as they set vertically on a specially designed car that will move in and out of the cleaning station and vapor blasting station on rails laid in the reinforced concrete floor.



on how to use and maintain portable power tools. It contains full information about all the methods of employing the drill, saw, combo tool, router-shaper-planer, sanders and other portable tools. There is advice on what tools to get for your specific requirements and how to oil, sharpen and care for your tools.

One of the most valuable features of the book is that it tells you the short cuts and labor-saving ways of doing things so that you can save time on the job. The book also incorporates valuable information on the characteristics of the various kinds of woods—hardness, working quality, weight, strength, best types of finish to apply, uses most suitable for and other special characteristics, such as decay resistance and proneness to splitting. Suggestions are given for reducing material costs by more economical selection of lumber.

Profitable Small Plant Management.

By Malcolm H. Gotterer. Published by Conover-Mast Publications, Inc., New York, N. Y. 318 pages. Cloth binding, board covers. Price, \$5.50.

This volume is a guidebook written expressly for management men in smaller and medium-size plants. It provides practical help and solutions to specific and pressing problems of the small plant manager. The author uses a practical approach to help you manage your plant profitably and efficiently. He offers a complete management program—simple, concise and practical.

The book includes information on organization, plant layout, methods improvement, production standards, wage incentives, materials control, job evaluation, merit rating, production control, manpower management and cost control. These are just some of the phases of small plant management covered by the book.



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new literature

1. **Honing Machine**, designated as the Model "AL," with a honing range upward from 0.185-in. diameter is described in a bulletin released by Superior Hone Corp., 1615 Elreno St., Elkhart, Indiana. Specifications are included.

2. **Cutting and Grinding Fluid**. Master Chemical Corp., 13 Huron St., Toledo 1, Ohio, has issued a brochure describing Trim Cutting and Grinding Fluid. Charts, graphs and technical data are included.

3. **Tool Post and Toolholders** for all lathe operations are described and illustrated in a catalog published by Aloris Tool Co., Inc., 131-37 Sanford Ave., Flushing 55, New York.

4. **Shaper**. A 7-in. bench shaper which features circulating force feed lubrication to important bearing surfaces is described in a bulletin (No. 5408D) issued by South Bend Lathe Works, South Bend 22, Indiana.

5. **Internal Comparator**. Portage Double Quick Tool Co., 1041 Sweitzer Ave., Akron 11, Ohio, has released a catalog describing and illustrating the Inter-Rapid Internal Comparator which measures from $\frac{3}{8}$ to 6 inches.

6. **Chucks** which feature flame hardened jaw ways to provide long effective chuck life are described and illustrated in a brochure published by Horton Chuck, Windsor Locks, Connecticut.

7. **Hand-Operated Press Brake** which provides 8 tons of power for bending, curling, box forming, corrugating, punching, blanking, hemming and flattening is described and illustrated in a bulletin released by O'Neil-Irwin Mfg. Co., 306 8th Ave., Lake City, Minnesota.

8. **Drill Heads, Drill Jigs, Feed Units, Drilling Machines, Broaching Machines, Collets, Holding and Indexing Fixtures and Lathe Chucks** are described in a catalog released by Zagar Tool Inc., 24000 Lakeland Blvd., Cleveland 23, Ohio.

9. **Geared Scroll and Independent Hardened Plate Type Chucks** are described and illustrated in a catalog issued by The Whiton Machine Co., New London, Connecticut.

10. **Surface Plates** for layout, inspection and checking operations are covered in a brochure published by Goodman Mfg. Co., Industrial Mfg. Division, Halsted St. at 48th, Chicago 9, Illinois.

11. **Drill Units**. Hause Engineering, Montpelier, Ohio, has issued a catalog describing the Holomatic Drill Units designed for use as heads on automatic-type special drilling machines.

12. **Air Gages**. The 5,000 to 1 magnification Dimensionair, which permits inspection of dimensions to fine practical tolerances, and the AirProbe, a unit which is said to increase the possibilities of gaging by air, are described in a catalog issued by Federal Products Corp., 4145 Eddy St., Providence, R. I.

13. **Utility Blast Cabinets** with 20 x 30-in. compartments are described and illustrated in a bulletin (No. 41) published by Reumelfin Mfg. Co., 3996 N. Palmer St., Milwaukee 12, Wisconsin.

14. **Oversize Granite Surface Plates** which are said to keep close tolerance are described in a catalog released by Herman Stone Co., 324 Harries Bldg., Dayton 2, Ohio.

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15. **Sprocket Ratio Calculator** which is designed to recommend the proper sprocket ratio for a specific feeding job, when using Wittek Roll Feeds in automatic stamping, has been issued by Wittek Mfg. Co., 4322 W. 24th Place, Chicago 23, Illinois.

16. **Dust Control System** for collecting emery dust, rough grinding dust and lint from a buffer with Dustkop Dust Collectors is described in a bulletin (No. 640-2) released by Agat-Detroit Co., 207 Main St., Ann Arbor, Michigan.

17. **Impact Extrusions.** A booklet covering the significant facts necessary to design products as impact extrusions has been issued by Aluminum Company of America, 724 Alcoa Bldg., Pittsburgh 19, Pennsylvania.

18. **Carbide Belt Finisher** for final finishing of carbide tools after rough finishing on a silicon carbide wheel is described in a catalog released by Hammond Machinery Builders Inc., 1615 Douglas Ave., Kalamazoo, Michigan.

19. **Square and Rectangular Gage Block Accessories** which permit the direct application of square gage block accuracy to a wide range of precision measuring and scribing operations are described in a catalog released by Ellstrom Standards Division, Dearborn Gage Co., 22035 Beech St., Dearborn, Michigan.

20. **Automatic Milling Machines.** A bulletin describing automatic precision balancing by metal removal, using automatic milling machines, has been published by The Motch & Merryweather Machinery Co., Cleveland 17, Ohio.

21. **Stub Reamers.** Twentieth Century Mfg. Co., Route 176 and Bradley Rd., Box 429M, Libertyville, Ill., has released a bulletin (No. 15) describing the "Supeream" line of stub reamers in decimal sizes. Specifications and prices are included.

22. **Industrial Air Specialties,** including air guns, air hose couplings, air hose stems and clamps and cleaning guns, are described and illustrated in a catalog (No. 4D) published by C. A. Claffin Co., 15 Hathaway St., Boston 10, Mass.

23. **End Mills, Router Bits, Counter-sinks, Counterbores, Corner Rounding Tools, Live Centers and Special Tools** are described and illustrated in a catalog (No. 54-C) issued by Melin Tool Co., Inc., 3373 W. 140th St., Cleveland 11, Ohio. The catalog is outlined into specific groups for easy reference.

24. **Planer-Type Milling Machines and Special Machines** are described and illustrated in a bulletin released by Simplex Machine Tool Corp., 4540 W. Mitchell St., Milwaukee, Wisconsin.

25. **Heavy-Duty Engine Lathe,** designated as the 16-Inch Series BB, is described and illustrated in a bulletin (No. BB53) issued by Boye & Emmes Machine Tool Co., 123 Caldwell Drive, Cincinnati 16, Ohio. Complete specifications are included in the bulletin.

26. **Small Cutting Tools** of extreme precision engineered to specific requirements are described in a catalog (No. 20) released by Woodruff & Stokes Co., Inc., Bldg. 39, 349 Lincoln St., Hingham, Massachusetts.

MODERN MACHINE SHOP

June, 1954

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27. **Liquid Honing.** Vapor Blast Mfg. Co., 3025 W. Atkinson Ave., Milwaukee 16, Wis., has issued a bulletin describing liquid honing, a method of surface finishing using fine abrasive powders suspended in a chemical solution and forced at high velocity against the surfaces to be treated.

28. **Vertical and Bench-Type Milling Machines** are described and illustrated in a bulletin published by The U. S. Burke Machine Tool Division, Brotherton Rd. 3, Cincinnati 27, Ohio. Specifications are included.

29. **Services for the Metalworking Industry**, including facilities for and examples of tools, dies, jigs, fixtures, gages, special machinery, fabrication, machinery repair and rebuilding and parts production, are shown in a catalog released by Pivot Punch & Die Corp., North Tona-wanda, New York.

30. **Power Transmission Equipment.** Variable speed pulleys, V-belts, sheaves, motor bases, countershafts and transmissions are described in a catalog issued by Lovejoy Flexible Coupling Co., 4945-4999 W. Lake St., Chicago 44, Ill.

31. **Stock Pushers** which are said to provide for scratch-free work are described and illustrated in a brochure published by Rigid Products Co., P.O. Box 162, Dept. M, Cincinnati 15, Ohio.

32. **Automatic Gear Grinding Machines** for gears, spline shafts and specially contoured parts are described and illustrated in a catalog released by The Gear Grinding Machine Co., 3901 Christopher, Detroit 11, Michigan.

33. **Water-Mix Cutting and Grinding Fluids.** The proper selection and application of four different water-mix cutting and grinding fluids are covered in a booklet released by D. A. Stuart Oil Co., Ltd., 2741-47 S. Troy St., Chicago 23, Illinois.

34. **Metal Cut-Off Band Saws** for cutting rods, tubes, angles, heavy rounds or flats and irregular shapes are described in a catalog released by The Johnson Mfg. Corp., Albion, Michigan.

35. **Surface Grinder.** Pratt & Whitney Division Niles-Bement-Pond Co., 25 Charter Oak Blvd., West Hartford 1, Conn., has issued a circular (No. 569) describing the Model "D" 14-Inch Hydraulic Vertical Surface Grinder. Specifications are included.

36. **Balancing Tools** which are said to be sensitive, simple and durable are described in a catalog released by Sundstrand Machine Tool Co., 2539 Eleventh St., Rockford, Ill. Specifications and a line drawing are included.

37. **Metallizing.** How metallizing helps railways save time and money in mechanical maintenance is discussed in a bulletin (No. 112) released by Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, New York.

38. **Hydraulic Power Units**, designated as Styles 22 and 22-L, which are used for advancing, feeding and retracting the cutting tools on special machines are described in a bulletin (No. 45040) released by Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Michigan. Complete specifications and dimensional drawings are included in the bulletin.

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39. **Die Manual** devoted to press brake dies and special tooling that answers many metal-forming problems has been published by Verson Allsteel Press Co., 9310 S. Kenwood Ave., Chicago 19, Ill.

40. **Honing Machines and Tools** are described and illustrated in a catalog released by Sunnen Products Co., 7910 Manchester Ave., St. Louis 17, Mo. Line drawings are included.

41. **Power Chucking Unit.** The Skinner Chuck Co., 210 Edgewood Ave., New Britain, Conn., has issued a bulletin (No. JP67) describing its "Junior" Power Chucking Unit for speeding production on small lathes.

42. **Die Heads** for cutting all types of threads on threading machines, turret lathes and automatic screw machines are described in a catalog released by Landis Machine Co., Waynesboro, Pa.

43. **Tube Socket Gage.** Size Control Co., Division American Gage and Machine Co., 2500 W. Washington Blvd., Chicago 12, Ill., has prepared a leaflet describing the "Gripmaster," a device for testing all R.E.T.M.A. and J.A.N. tube socket specifications.

44. **Rotary Swaging** is described in a bulletin released by The Torrington Co., 730 North St., Torrington, Connecticut.

45. **Direct Reading Ramp Gages** which are said to reduce the cost of taper thread inspection are described in a catalog published by The Sheffield Corp., Dayton 1, Ohio.

46. **"The ABC's On Maintenance of Air and Hydraulic Equipment,"** which deals with its subject in cartoon style through a more or less exaggerated approach, has been issued by Logansport Machine Co., Inc., 801 Center Ave., Logansport, Indiana.

47. **Carbide Rotary Files** which are ground from the solid are described and illustrated in a bulletin published by Grobet File Company of America, 421 Canal St., New York 13, New York.

48. **Surface Grinder.** The Thompson Grinder Co., Springfield, Ohio, has published a catalog (No. F53) describing its Type F Surface Grinder for toolroom and small parts production.

49. **Low Carbon Plate Grinding Service.** Marshall Steel Co., P.O. Box 108M, La Grange, Ill., has issued a bulletin describing the Marshall "LC Rat" Low Carbon Plate Grinding Service.

50. **Three-Dimensional Binocular Magnifier,** designated as the "Magni-Focuser," is shown "on-the-job" in a folder released by Edroy Products Co., 480 Lexington Ave., New York 17, New York.

51. **Flame Hardening Equipment.** The Cincinnati Milling Machine Co., Cincinnati 9, Ohio, has issued a brochure dealing with Flamatic selective heating which provides high heating capacity, electronic control and versatile, low-cost tooling.

52. **Fixture-Lock Combinations and Applications** are described in a catalog released by Swartz Tool Products, Division of Jefferson Corp., 13330 Foley Ave., Detroit 27, Michigan.

53. **Horizontal Bench-Type Milling Machine** which is accurate, sturdy and compact is described in a bulletin published by Elgin Tool Works, Inc., 1771 Berneau Ave., Chicago 13, Illinois.

54. **Precision Drill Grinder** for small drills is described and illustrated in a bulletin (No. 754) released by Black Diamond Saw & Machine Works, Inc., 71 North Ave., Natick, Massachusetts.

55. **Direct-Pressure Dry-Disc Push-Type Clutch** for heavy-duty service on off-the-highway vehicles, buses and trucks is described in a booklet (Type DP Manual) issued by Lipe-Rollway Corp., 814 Emerson Ave., Syracuse 1, New York.

56. **Wedge Lock.** Wesson Co., 1220 Woodward Heights Blvd., Ferndale (Detroit 20), Mich., has prepared a folder describing the Dual-Wedg Lock, giving complete specifications, applications and range of sizes available.

57. **Combination Decimal Equivalent Chart and Calendar,** printed in two colors and making a ready reference chart, has been issued by Dayton Rogers Mfg. Co., Minneapolis 7, Minnesota.

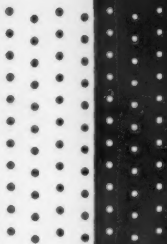
58. **Super-Sensitive Small-Hole Tapping Machine** for the tapping of small holes is described in a bulletin (No. T-54) published by The Hamilton Tool Co., 828 S. Ninth St., Hamilton, Ohio.

59. **Flexible Shaft Machines** for sanding, grinding, wire brushing, drilling, buffing, filing and polishing operations is described in a bulletin (No. 536) issued by Stow Mfg. Co., 1 Shear St., Binghamton, New York.

60. **Heat-Treating Furnaces** for industry are described and illustrated in a bulletin (No. 653) published by Hevi Duty Electric Co., Milwaukee 1, Wisconsin.



USE CARD FOR FREE LITERATURE



metalworking news in brief

Lindberg Engineering Co., Chicago, Ill., has announced the appointment of **L. H. Remiker** as manager of its newly formed Field-Erected Equipment Division. Mr. Remiker has been with Lindberg for the past 19 years, serving in the capacity of chief engineer. **R. A. Hastings**, formerly vice president of Continental Industrial Engineers, Inc., has become associated with Lindberg. Mr. Hastings will head up the sales department of a new division.

— o —

Frederick W. Lindblad, president of the United States Diamond Wheel Co., Aurora, Ill., was invited by President Eisenhower to attend the President's Conference on Occupational Safety which recently convened in Washington. Mr. Lindblad has been active in the national scene for the past several years, serving on Industry Advisory Committees of the National Production Authority.

— o —

Lukens Steel Co., Coatesville, Pa., has announced the appointment of **W. E. Mullestein** as general manager of sales. Mr. Mullestein was formerly manager of field sales. The company has also announced the appointment of **Ben R. Slocum** as manager of personnel administration and **Harry H. Morton** as acting supervisor of employment. Mr. Slocum was formerly supervisor of employment, and Mr. Morton served as personnel assistant.

The appointment of **Henry W. Doctor** as a district sales manager for the Tubular Products Division of The Babcock & Wilcox Co., Beaver Falls, Pa., has been announced by **James S. Anderson**, general sales manager of the division. Mr. Doctor will take charge of the new district sales office located in Cincinnati, Ohio.

— o —

Allegheny Ludlum Steel Corp., Pittsburgh, Pa., has announced the opening of a new tool steel warehouse and district sales office located in a newly constructed building at 3800 N. First St., Milwaukee, Wis. The warehouse has been established to offer better service to industry in the city and throughout Wisconsin on the complete line of Allegheny Ludlum tool steels.

— o —

Western Tool & Supply Co., 285 Fifth St., Oakland, under the direction of **J. G. MacPherson**, and Precision Tool Sales, 2500 W. Sixth St., Los Angeles, managed by **Lew Goodwin**, were named representatives in California by Lodding, Inc., Worcester, Mass. The De Eugenio Tool Center, 119 S. 11th Ave., Phoenix, with **John De Eugenio** in charge, was selected to represent Lodding in Arizona. The company has also announced the opening of a new office in Dayton, Ohio, by Donald B. Hunting Co., 1904 Brown Street. **Lee Weber** is in charge of the Dayton office.

Metalworking News in Brief

John W. Frazier has been named field manager of air filter sales by American Air Filter Co., Inc., Louisville, Ky. With headquarters in the Oliver Building in Pittsburgh, Mr. Frazier will work with the various district sales offices of the company over the nation.

— o —

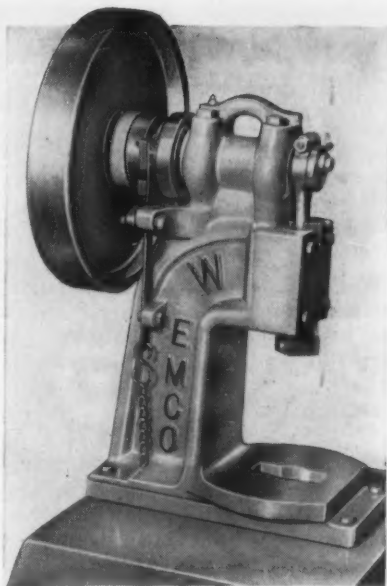
R. J. Reif has been appointed advertising manager of The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio. Mr. Reif was formerly assistant advertising manager of National Machinery Co., Tiffin, Ohio.

— o —

Lloyd D. McDonald, executive vice president of The Warner & Swasey Co., Cleveland, Ohio, died recently at his home in Shaker Heights. Mr. McDonald joined Warner & Swasey in 1918 and became executive vice president in 1950. He had been a director of the company since 1936.

— o —

Standard Pressed Steel Co., Jenkintown, Pa., has advanced three men to important positions. **William M. Briner** has moved up from supervisor of industrial relations services to supervisor of industrial relations. In addition to previous duties of wage and salary administration, training, dismissals, pension plan and insurance plan administration, he is now responsible for hiring, transfers and placement. **William M. Kerrigan**, formerly supervisor of planning and scheduling, has been made supervisor of production control, expediting and stock moving planning. Included in his responsibilities is the scheduling of first and second operations. **William J. Park** has advanced from general foreman of quality control to manager of quality control. His responsibilities include product inspection, quality assurance, quality review and Magnaflux inspection.



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KLAAS-BUILT

Metalworking News in Brief

Emil Gairing, founder and former president of the Gairing Tool Co., Detroit, Mich., has joined the Waukesha Tool Co., Waukesha, Wis., as a stockholder, director and executive vice president. In his new capacity, Mr. Gairing is responsible for sales, engineering and production.

— o —

Westinghouse Air Brake Company has announced that **James A. Carlson** has been appointed assistant vice president for sales coordination. Mr. Carlson was formerly assistant to the president.

— o —

Lindberg Engineering Co., Chicago, Ill., has announced the appointment of **Robert A. Foley** as salesman for its Chicago district office.

— o —

The appointment of **Richard K. Stevens** as industrial relations manager of the Chicago district has been announced by United States Steel Supply Division, U. S. Steel Corp., Chicago, Ill. Mr. Stevens was formerly industrial relations assistant in the Chicago general office. The company has also announced the appointment of **Warren F. Hjerpe** as assistant district manager in Chicago, succeeding **Earl L. Simanek** who was promoted to district manager in St. Paul, Minnesota.

Frank A. Benoit, Jr., has been appointed foundry and pattern shop superintendent of Brown & Sharpe Mfg. Co., Providence 1, R. I. Mr. Benoit succeeds **LeRoy M. Sherwin**, who has retired.

— o —

The Machine Tool Division of Kalamazoo Tank & Silo Co., Kalamazoo, Mich., has announced the appointment of **Don Huckle** as representative for its line of metal-cutting band saws in the State of California. Mr. Huckle has his headquarters at 304 Tenth St., Oakland, California.

— o —

The Lincoln Electric Co., Cleveland, Ohio, has announced the assignment of four additional application engineers to field districts. **Robert Clipsham** is located in Kansas City; **Gordon Collier** has been assigned to the Philadelphia district; **John Gonzales** is in the Columbus district office; and **Donald Hastings** has been assigned to Lincoln's West Coast Emeryville district.

— o —

The election of **B. B. Countryman** as vice president of the purchasing division and **I. R. Hansen** as assistant treasurer has been announced by Minnesota Mining & Mfg. Co., St. Paul, Minn. Mr. Countryman has been associated with the firm since 1928, and Mr. Hansen joined the company in 1943.

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Cuts clean threads — acts instantaneously!
Frees stuck taps and reamers right now!
Speeds tapping — not a cutting oil!

Dealers and jobbers:
Some territories still available. Write:

SMITH TOOL & ENGINEERING CO.

A DIVISION OF SMITH-CAGE • YUCAIPA, CALIFORNIA



Metalworking News in Brief

The Rotor Tool Co., Cleveland, Ohio, manufacturer of pneumatic and high cycle electric tools, has announced that **Big Three Welding Equipment Company** will distribute its products in Texas, Oklahoma and New Mexico. Big Three maintains 21 offices in the three states and will carry stocks of tools and parts.

— o —

Norton Co., Worcester, Mass., has announced that **Hugh T. Price, Jr.**, was made factory manager of the Grinding Machine Division, replacing **Iver G. Freeman** who became vice president of Reed-Prentice Corporation. Mr. Freeman was associated with Norton's Grinding Machine Division for 38 years. **Roland T. Nelson** replaces Mr. Price as production manager, while **Oscar A. Erickson** takes over Mr. Nelson's position as planning engineer.

— o —

Miller Fluid Power Co., Melrose Park, Ill., has announced that **Richard M. Morgan** has been placed in charge of production tooling, production engineering and plant layout. Mr. Morgan was formerly a design engineer for Harris-Seybold-Potter Company. **Dave Alexander** has been appointed salesman in the Philadelphia area and will work with **Paul Davison** who has been representing Miller in this territory for the past year. **Wilfred A. Pehl** has been appointed field engineer for Miller's Cleveland territory, and **John Howard Shankland** has joined the Miller organization as market research analyst. The company has also announced that **Terry Morris**, former production control supervisor, has been advanced to the order processing department. Succeeding Mr. Morris as production supervisor is **George Permanian** who has been promoted to this position from Miller's machine shop.

June, 1954

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LIFE
AND
ACCURACY**

**UNIVERSAL
ENGINEERING
COMPANY**

179-B

FRANKENMUTH 9, MICHIGAN

Metalworking News in Brief

The Taft-Peirce Mfg. Co., Woonsocket, R. I., has announced the appointment of **Richard F. Coe** as advertising manager. Mr. Coe has been associated with Taft-Peirce since 1953 as an advertising assistant.

— o —

Cleveland Instrument Co., Cleveland, Ohio, has announced the appointment of **Robert A. Manes** as vice president to head up the company's expanding sales activities on precision dimensional gaging equipment. Mr. Manes has had wide experience in the distribution and sale of precision gaging products and was formerly associated with Fonda Gage Company.

— o —

American Emery Wheel Works, Providence, R. I., has announced the retirement of **Arthur L. Pierce** after 46 years of service with the company. At a recent stockholders' meeting, the following officers were appointed, all of whom have had an active interest in the company for many years: **Fredrick J. Darby**, president and works manager; **Harold O. Skoog**, vice president and ceramic engineer; **Torrey Allen**, treasurer and general manager; and **William W. Turner**, secretary and sales manager. **John A. Doherty**, previously connected with the main sales office, has been appointed abrasive engineer for the Rhode Island and adjacent Massachusetts territory.

Maxwell R. Warden, president and general manager and a director of the Remington Arms Company, Inc., has been elected a member of the board of directors of The Bullard Co., Bridgeport, Conn. Mr. Warden replaces **Lee A. Swem**, who retired from the board because of ill health. Mr. Swem, a vice president of the Foster Wheeler Corporation, had been a member of the board of directors of Bullard since 1948.

— o —

Pivot Punch & Die Corp., North Tonawanda, N. Y., has announced the appointment of **Clifford Canning** as sales engineer for Ohio, Indiana and Kentucky. With headquarters located at 2010 Sundale Ave., Cincinnati 24, Ohio, Mr. Canning will represent the company's line of special machinery, tools, dies, jigs, fixtures and production facilities for the metal trades industry.

— o —

Danly Machine Specialties, Inc., Chicago manufacturer of mechanical presses and die sets, has announced the appointment of **John L. Ongemach** as manager of the Cleveland branch office, **B. A. Hall** as manager of the Dayton office and **Niel Griest** as sales engineer in the Dayton branch.

— o —

The Research and Development Center of The Babcock & Wilcox Co., Alliance, Ohio, has announced the following appointments: **P. R. Grossman** to chief engineer with responsibility for all work undertaken by the products, materials and technical sections of research and development, both at the Center and in the field; **A. F. Boehm**, manager of facilities with responsibility for office management and maintenance; **G. A. Watts** to superintendent of products section; **J. F. Wachunas** to superintendent of the technical services section; and **W. O. Stone, Jr.**, to purchasing agent of the Center.

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Metalworking News in Brief

The Gear Grinding Machine Co., Detroit, Mich., has announced the appointment of **William F. Wilson** to the position of works manager. In his new position, Mr. Wilson will be in charge of all manufacturing operations in the company's Joint Division, Gear Division and Machine Tool Division.

— o —

Robert M. Simpson has been named assistant manager of the San Francisco sales branch of Crucible Steel Company of America, Pittsburgh, Pa. Mr. Simpson joined Crucible in 1941 and has held various metallurgical positions.

— o —

Allegheny Ludlum Steel Corp., Pittsburgh, Pa., has announced the appointment of **Junger Steel & Supply Co.**, 765 Hampden Ave., St. Paul, Minn., to sell the complete line of Ludlum tool steel, bars, forgings and castings. The warehouse firm was recently formed to service the needs of the metalworking industry in the area by **E. F. Junger** and **Fred F. Junger**.

— o —

National Twist Drill & Tool Co., Rochester, Mich., has announced the election of **Carl J. Oxford** to the board of directors. Mr. Oxford has been chief engineer of the company for more than 30 years.

— o —

Tamms Industries, Inc., Chicago, Ill., has announced the appointment of **S. L. Abbot Company** as representative in the San Francisco and northern California areas. Abbot also represents Tamms in the southern California area.

— o —

National Pneumatic Co., Inc., and Holtzer-Cabot Divisions, Boston, Mass., have announced the appointment of **Harvey J. Finison** as director of engineering. Mr. Finison was formerly associated with the Armour Research Foundation, Chicago, Illinois.

The Lincoln Electric Co., Cleveland, Ohio, has announced the election of **Robert Wilson** to the board of directors. Mr. Wilson, a member of Lincoln's sales and engineering staff for the past 17 years, is head of application engineering and director of training. The company has also announced that **Robert E. Sage** has been made assistant to the executive vice president, **J. S. Roscoe**. Mr. Roscoe is in charge of business administration and sales, and Mr. Sage will act as an administrative assistant for sales.

— o —

Edward H. Wheeler, formerly chief engineer at Standard Pressed Steel Co., Jenkintown, Pa., has been made manager of the Forging Division, in charge of hot and cold headers, production thread rollers and the facing and drill, broach and knurl sections. Succeeding Mr. Wheeler as chief engineer is **John M. Sherman**, formerly manager of quality control.

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Metalworking News in Brief

Joseph A. Batlle Company has moved from old quarters at 401 Broadway, New York City, to a large new air-conditioned building at 47 Hillside Ave., Manhasset, N. Y. A representative of Size Control Co., Division of American Gage and Machine Co., Chicago, Ill., **Joseph A. Batlle Company** will feature a complete display of Size Control reversible gages in a specially designed lobby.

— o —

Norton Co., Worcester, Mass., has announced that **Raymond M. Rebert** has been named chief chemist in charge of the chemical section of the research and development department, replacing **Mark O. Lamar** who has retired after 37 years with the company. Mr. Rebert has been an analytical chemist since he joined the company 27 years ago.

Richard G. Jones was elected to the board of directors and **Frank H. Wemple** was elected treasurer at the annual meeting of **Handy & Harman**, New York, N. Y. Mr. Jones is secretary and controller of the company and is also a director and secretary of **Handy & Harman of Canada, Ltd.** Mr. Wemple, who has been assistant secretary and the head of the company's Trading Department, succeeds **Howard W. Boynton** who is continuing as vice president.



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Sturdy 16 ga. metal.
20" long x 12" wide
x 6 1/4" deep. Drag
holes and handles at
both ends.

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Bridgeport 5, Conn.

Lipe-Rollway Corp., Syracuse, N. Y., has announced the appointment of **Edgar N. Mather** as machine tool sales engineer for the firm's mid-west and east central sales area. This sales territory comprises an area running westward from Erie, Pennsylvania to the Mississippi River and south to Louisville, Kentucky.

— o —

Cincinnati Lathe & Tool Co., Cincinnati, Ohio, has announced the promotion of **John D. Humphreys** to assistant chief engineer. Mr. Humphreys was formerly a member of the engineering department and has been associated with various machine tool design, production and sales activities for the past eight years.

— o —

Destiny Products Co., Detroit, Mich., has announced the appointment of **Allen B. Doggett** as district manager covering the northern New York State district. With headquarters at East Street, Pittsford, N. Y., Mr. Doggett will operate throughout the area west of Albany, including all of New York State north of the Pennsylvania line.

— o —

Raymond J. Contrucci, formerly in the sales distribution section of Dodge Division, Chrysler Corporation, was named sales representative by Carboloy Department of General Electric Co., Detroit, Mich. Mr. Contrucci has joined the New England district headquarters in Wellesley Hills, Massachusetts.

— o —

Parker N. Wheeler, previously manager of the Unisorb Division of The Felters Co., Boston, Mass., has been assigned to the firm's Jackson, Michigan, plant where he will be in charge of market development work. **James W. Morrison**, for several years Philadelphia branch manager for the company, has been named manager of the Unisorb Division in Boston.

Metalworking News in Brief

Firth Sterling Inc., Pittsburgh, Pa., has announced the election of **Donald G. Clark** as a director of the company. Mr. Clark was a vice president and a director of Firth Sterling from 1928 to 1945 when he retired from active management. For the past few years he has served in a consulting capacity.

— o —

The appointment of the **Service Power Transmission Co.**, 13-01 Fifth St., Fair Lawn, N. J., and **Navarro Supply Co.**, Pecos, Texas, as distributors of Morse mechanical power transmission products has been announced by Morse Chain Co., Detroit, Mich. Jan.

— o —

The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., has announced the appointment of **George Backman** as manager and chief engineer of its Rolling Mill and Mill Machinery Division. The company has also announced the promotion of **Harry Lange** from assistant chief engineer to chief engineer in charge of the Bolt, Nut, Screw & Rivet Machinery Division, succeeding **Joseph M. Schaeffer**, who was recently named president of the company.

— o —

Jack F. Anschuetz has been named assistant sales manager of Clearing Machine Corp., Chicago, Ill. In his new capacity, Mr. Anschuetz will be responsible for the sales of open back inclinable presses and other press equipment now being manufactured in Clearing's Hamilton, Ohio, plant.

— o —

Alden Supply Co., Inc., Philadelphia, Pa., has been named an authorized distributor for Carboly Department of General Electric Co., Detroit, Mich. Alden will carry Carboly's entire line of standard cemented carbide tools and blanks, carbide-tipped masonry drills and diamond wheel dressers.

Aluminum Company of America, Pittsburgh, Pa., has announced that **J. M. Hileman**, fabricating division staff assistant, has been named works manager of its Richmond (Indiana) Works. Mr. Hileman has been associated with the company for 32 years.

— o —

Gardner Machine Co., Beloit, Wis., has announced several personnel changes. **R. E. Price** has been named general manager. Mr. Price, formerly associated with Landis Tool Company for 23 years, joined Gardner in 1952. **Russell L. Dustman, Jr.**, has been appointed manager of the sales office in Richmond, Indiana, and will supervise sales and service for Gardner disc grinders in southern Indiana, western Ohio and Kentucky. **John E. Schobinger**, formerly manager of the Hartford sales office for Landis Tool, has been named manager of the Detroit sales office for the machinery division of Gardner.

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Metalworking News in Brief

Numatics Operating Valves, Milford, Mich., has announced the appointment of **George Doig** as sales manager. Mr. Doig was formerly associated with J. N. Fauver Co., Detroit, Mich., where he had been local sales engineer.

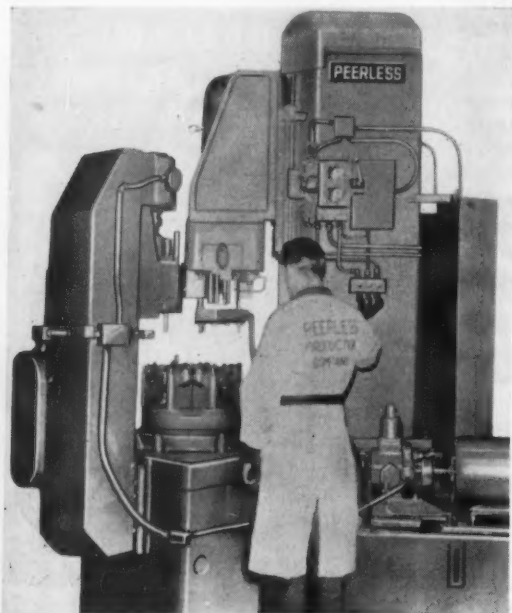
— o —

The announcement of the promotion of two executives of Lincoln Park Industries, Inc., Lincoln Park, Mich., has been made by Gene DeMambro, president. **John Delaney**, formerly development engineer, has been made vice president and factory manager, and **Robert G. Field**, formerly plant manager, has become sales manager and administrative assistant. Mr. Delaney, whose entire career has been devoted to engineering, development and sales work in the gage industry, joined Lincoln Park in 1952. Mr. Field joined the company in 1942.

Barber-Colman Co., Rockford, Ill., has announced the appointment of **Howard A. Nelson** as administrative assistant to the sales manager in the machine and small tools divisions. **Nels O. Thornbloom** has been appointed chief engineer of machine tool sales, and **Stuart J. Johnson** has been named chief engineer of the small tool division.

— o —

Ampco Metal, Inc., Milwaukee, Wis., has announced the appointment of two companies as special licensees. **The Cadmet Corp.**, 20801 Ryan Rd., P. O. Box 4631, Mt. Elliott Station, Detroit 34, Mich., has been appointed as licensee to produce and sell precision castings made from Ampco metal. **The Alloy Steel Products Co., Inc.**, Linden, N. J., has been appointed as a licensee to produce castings from Ampco ingot for use in its valves and valve parts.



Specialized Production Equipment for Automatic Transmissions

THE Peerless specialized production equipment shown herewith is now being used by one of the larger manufacturers of automatic transmissions. It performs drilling, chamfering and tapping operations on 160 transfer plates per hour at 100 per cent efficiency. This 2-way vertical machine has a vertical 14-inch-way hydraulic-feed unit and welded steel tapping column, and a 24-inch 4-station automatic power index. Tooling is comprised of a 4-station fixture, 13-spindle drilling-and-chamfering head, and an individual single-spindle No. 19 lead-screw tapping head.

Metalworking News in Brief

Clearing Machine Corp., Chicago, Ill., has announced the transfer of **George Herrick** to its Detroit sales office. Mr. Herrick was formerly in charge of the Clearing office in Lansing, Michigan.

— o —

W. J. Thomas, general manager of the Tubular Products Division of The Babcock & Wilcox Company, has been named as vice president of the company by the board of directors. Mr. Thomas has been associated with B & W since 1932.

— o —

Surface Combustion Corp., Toledo, Ohio, has announced the moving of its Chicago Industrial Furnace Division office from Room 1270, 122 S. Michigan Avenue to Park Ridge Federal Bank Bldg., 116 S. Prospect, Park Ridge, Illinois.

— o —

Sidney Andrews has been named vice president in charge of research and development for the Metal Removal Co., Chicago, Ill. In his new position, Mr. Andrews will be working on the firm's abrasive grinding wheels, discs and mounted points.

— o —

The election of **C. Paul Porterfield** as vice president and general manager has been announced by The Method X Company, an affiliate of Firth Sterling Inc., Pittsburgh, Pa. Mr. Porterfield was formerly chief engineer.

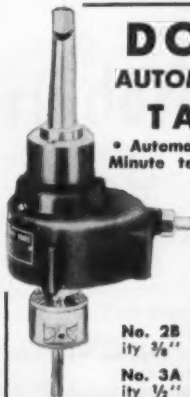
— o —

The election of **Kenneth J. Shea** as vice president of sales for the International Division has been announced by the board of directors of Minnesota Mining & Mfg. Co., St. Paul, Minn. Mr. Shea's new responsibilities include general sales administration of all foreign subsidiaries, European export sales and supervision of all international product sales managers.

John Bartizal, executive vice president, Clearing Machine Corp., Chicago, Ill., has announced the appointment of **James Bere** to the assistant general manager's post at the company's Hamilton, Ohio, plant. Mr. Bere has, until recently, managed the southern Ohio sales territory for Clearing prior to that time had worked in Clearing's Chicago sales office. Mr. Bere has been associated with the company since 1946.

— o —

American Gas Furnace Co., Elizabeth, N. J., manufacturer of industrial heat-treating furnaces and industrial gas equipment, has announced the appointment of **Daniel F. Malloy**, who operates the Malloy Heat Treating Co., 11648 S. Atlantic St., Lynwood, Calif., as the exclusive representative in Southern California. The company has also announced that **W. R. Ross**, sales engineer, formerly with the Electric Furnace Company, has joined the staff of the J. E. Von Maur Co., Columbus,



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• WIDE RANGE TAP CAPACITY.

No. 1A FRICTION DRIVE TAPPER — capacity No. 2-56 to 3/8" in Steel — 1/2" in Aluminum.

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No. 3A POSITIVE TAPPER — capacity 1/2" to 1 1/4" in Steel — 1/2" to 3/4" Pipe Taps.

No. 4A TAPPER — capacity 3/4" to 2" in Steel including Pipe Taps.

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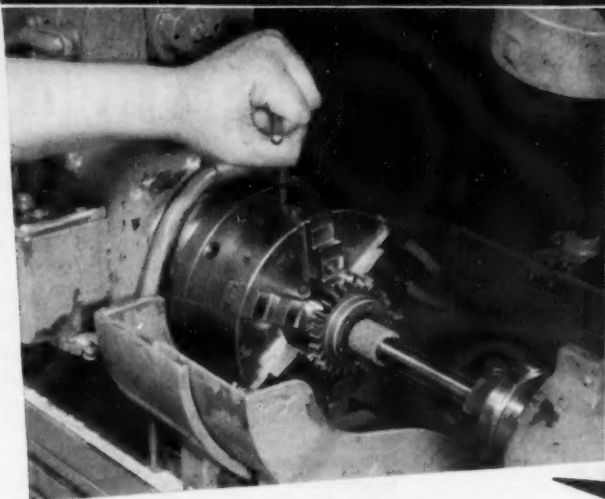
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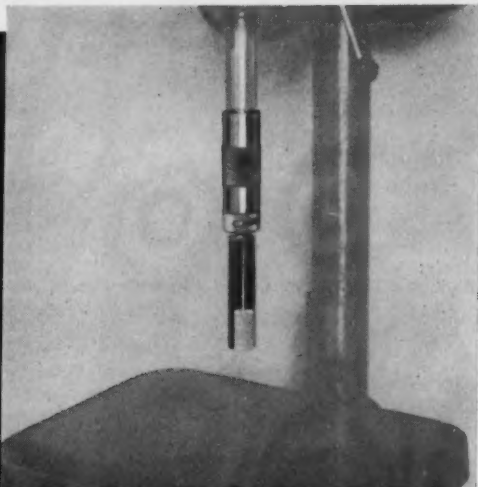
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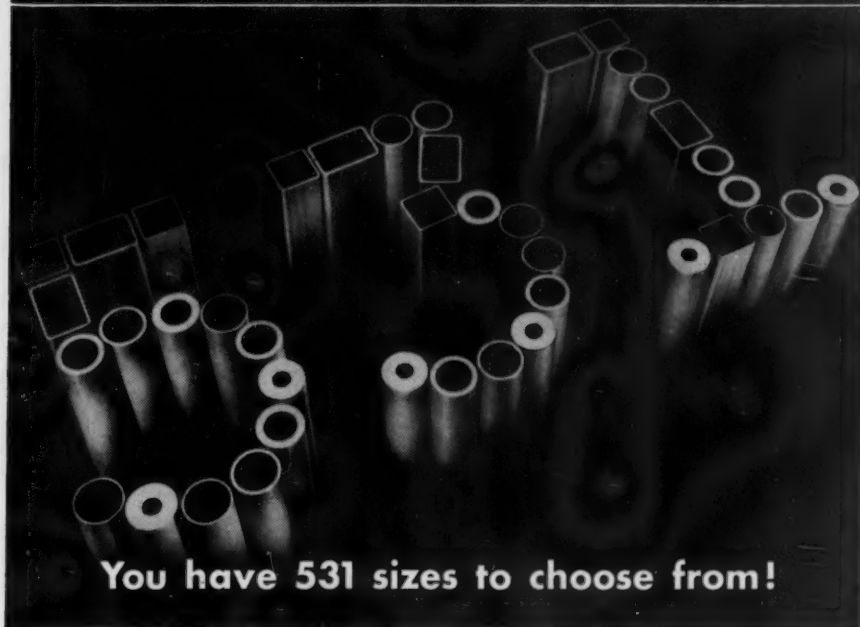
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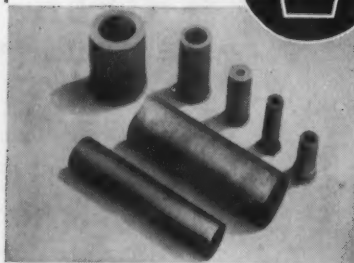
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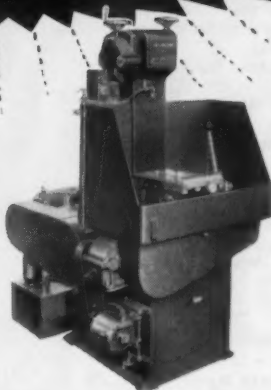
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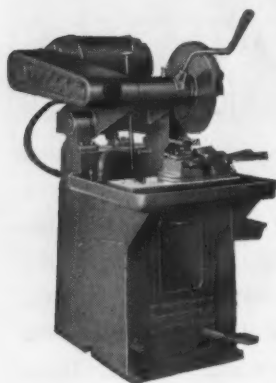


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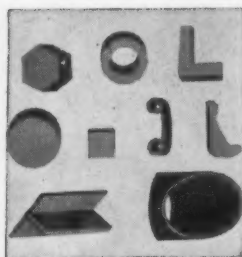


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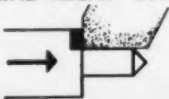
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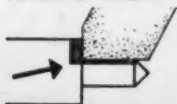
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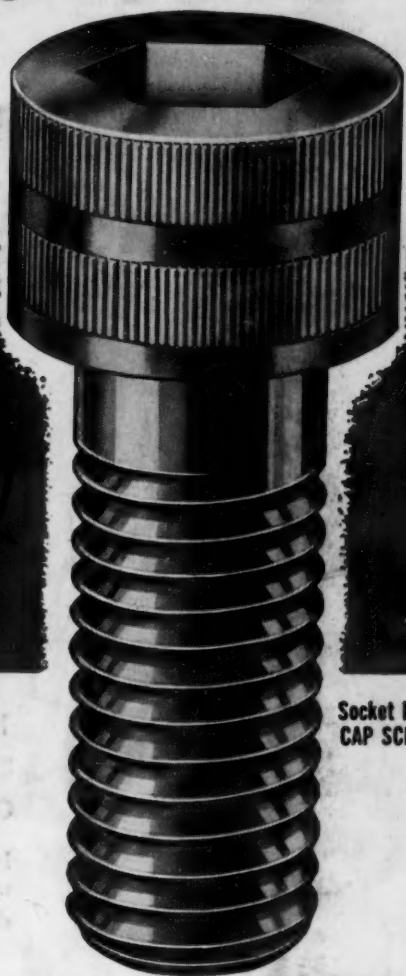
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